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HAMILTON-WENTWORTH REGIONAL TRANSIT SYSTEM


1984 Service Plan - Urban Transit Services

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February 20, 1984

Mr. H. O. Schweinbenz
Public Transit Manager
Hamilton Street Railway Company
18 Wentworth Street North
Hamilton, Ontario

Dear Mr. Schweinbenz:

1984 Service Plan for Urban Transit Services

In accordance with our agreement, we are pleased to submit this 1984 Service Plan for the urban transit services within the Hamilton-Wentworth Region. The Plan covers the recommended route changes for 1984 plus suggestions for further changes in 1985 and beyond based on extensive user surveys conducted during 1983.

The Service Plan is the third step in the review of the management, operations and physical plant of the Hamilton Street Railway Company and Canada Coach Lines Ltd. The first step was the Strategic Plan which was produced in January, 1983, and the second step is the Management Plan which has recently been released in draft for review by staff.

The attached document is structured in seven chapters. The first chapter summarizes our findings, and sets out detailed recommendations concerning route and service improvements over the period 1984-87 including the projected financial impact on the area municipalities. The second chapter reviews and evaluates the existing urban transit services, and the third and fourth chapters reviews the trends and issues which influence the improvement of these services. The fifth chapter describes the recommended modifications to the routes of the base system of the HSR, and the sixth chapter describes a proposed bus rapid transit system to supplement this base system. Finally, the seventh chapter sets out a financial plan for the recommended urban transit services including suggested fare rates and cost-sharing arrangements.

The development of the Service Plan involved about nine months of intensive effort on the part of HSR staff and consultants during 1983. This extensive effort was required in order to create a data base which can be easily updated and an evaluation methodology which can be consistently applied on a regular basis by staff in the future.

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GOVERNMENT DOCUMENTS

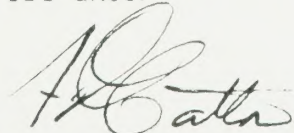
The policy framework within which this Service Plan has been developed was contained within the report entitled "1983 Five Year Strategic Plan" dated January 28, 1983. Each area municipality has received the Strategic Plan which forms the basis of the Service Plan. Accordingly, we make the following recommendations for your consideration:

1. That the route changes recommended for 1984 implementation be approved and that staff be authorized to make the necessary preparations and applications; these changes are shown in Exhibit 1.2 and are summarized in Chapter 1.
2. That the Bus Rapid Transit (BRT) System proposed for implementation in 1985 and 1986 be approved, in principle, and that staff be authorized to prepare a detailed action plan for its implementation; the proposed routings of the BRT system are shown in Exhibit 1.3 and are summarized in Chapter 1.
3. That staff be authorized to undertake a public participation program, commencing immediately, to explain the route changes and BRT system to the public.
4. That the corporate policies, as set out in the 1983 Five Year Strategic Plan and attached as an appendix to the Service Plan, be approved including an expansion of the Urban Transit Area (UTA) and the allocation of urban transit operating deficits to each UTA municipality by means of a ridership based cost-sharing formula; the projected financial impact of these policies on the area municipalities is given in Exhibit 1.4 in the attached Service Plan.
5. That a Technical Committee of area municipal representatives be created to assist the HSR in setting levels of service in the area municipalities contained within the expanded UTA.
6. That staff be authorized to undertake a review of the fare structure and associated fare collection systems in keeping with the capital budget.

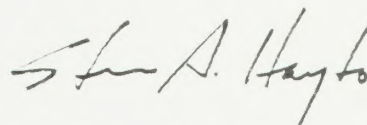
When the above recommendations are implemented, it is expected that the Service Plan can be accomplished without increasing the overall tax burden on regional residents. And most importantly, the proposed service improvements, particularly the Bus Rapid Transit System, should revitalize urban transit services within the Hamilton-Wentworth Region and make them fully supportive of the goals of the Official Plan.

Yours truly

IBI GROUP



F. D. Catton
Director



S. A. Hayto
Associate

HAMILTON-WENTWORTH REGIONAL TRANSIT SYSTEM

1984 SERVICE PLAN
URBAN TRANSIT SERVICES

IBI Group
in association with: M.M. Ross and Associates Ltd.
January, 1984

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EXHIBITS:

- 1.1 HSR BASE SYSTEM MODIFICATION (Early 1984)
- 1.2 HSR BASE SYSTEM MODIFICATION (Late 1984)
- 1.3 PROPOSED BUS RAPID TRANSIT SYSTEM
- 1.4 SERVICE PLAN BUDGET FORECAST
- 2.1 PASSENGER CLASSIFICATION SURVEY RESULTS (May 1983)
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- 5.4 IMPACT OF ROUTE MODIFICATIONS (Late 1984 and Beyond)
- 6.1 SUMMARY TABLE OF BUS RAPID TRANSIT OPTIONS
- 6.2 SUMMARY TABLE OF LOCAL SERVICE OFFSET
- 7.1 FARE STRUCTURES
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- 7.3 TREND AND TARGET FORECASTS OF SERVICE PLAN FINANCIAL IMPACTS
- 7.4 EXPECTED TAX BURDEN ON AREA MUNICIPALITIES

1. SUMMARY OF SERVICE PLAN FINDINGS AND RECOMMENDATIONS

The purpose of the Service Plan is to define the services which the Hamilton-Wentworth Regional Transit System should provide over the period 1984-87. The services which are proposed for implementation have been developed in response to the policies put forward in the 1983 Strategic Plan and in light of the performance of the existing urban transit services.

The existing transit services were reviewed in detail through an examination of data on ridership and operations collected during the spring and summer of 1983. In addition, population and employment trends in the Region were examined and an analysis of the transportation trends was performed. The transportation trends which included transit trip and person trip origin/destination information in the Hamilton area were used to develop and identify potential bus rapid transit corridors.

FINDINGS

Based on the review of the existing system and the demographic trends, a number of key transit planning issues were identified for consideration during the development of the Service Plan. These issues have been grouped into three categories as follows:

- o service issues;
- o demographic issues;
- o financial issues.

Findings under each of these categories are summarized below.

Service Issues

- o The major east-west routes offer an inappropriate level of service for passengers on long trips due to the high frequency of stops along the route. In order to attract additional riders on these routes, particularly during the peak periods, it is important to reduce average travel time.
- o Due to the multiple destinations in the lower part of the City, passengers from the Mountain have a relatively high transfer rate on the transit system. While it will be difficult to eliminate these transfers, strong emphasis should be placed on maintaining the coordination of the Mountain routes with the major east-west routes.
- o There is also a strong transfer movement between the King route and the Delaware route west of the downtown area. These transfers could be eliminated by an express service paralleling the King route to McMaster University.
- o The location of the proposed GO-ALRT station in downtown Hamilton will have an important impact on the transit route structure in the downtown area. Wherever practical, major transit routes which enter the downtown area should directly serve the GO-ALRT station.
- o Level of service to the industrial area at the Bayfront is generally low, particularly at the eastern end of this area. As in the case of the downtown area, there is a need for more direct transit access to the industrial area from the outlying residential sections of the City and a need for a reduction in transit travel times.
- o There is a need for faster express-type bus services which are well integrated with the regular routes of the transit system in order to minimize travel times and maximize the desirability of transit use within the Region.
- o As express bus services are developed, they should be done with regard to Regional Planning Policy.

Demographic Issues

- o The next five years will see a decrease in the number of students, and increases in the number of young adults and senior citizens. These trends will have impacts on the types of transit services required by the population of the Region and on the proportion of low fare riders which the transit system is likely to carry.
- o It is important that the Service Plan take into account the potential demand between the growing suburban areas of the Region and the downtown and Bayfront areas of the City where employment is concentrated.
- o The long term population and employment trends experienced over the last five to 10 years are expected to continue into the near future. Therefore the need for effective transit connections between the suburban areas and the central area of the City will continue to grow.

Financial Issues

- o Because of the high number of senior citizens using the transit system and the expectation that this number will grow in the future, it is important to determine what the regional transit system's role is in serving and subsidizing travel by senior citizens as well as other groups such as students and children.
- o The present service setting and cost sharing arrangements for the HSR limit the Region's ability to improve urban transit services within the area municipalities on a consistent basis. Accordingly, these arrangements will need to be rationalized in order that the Service Plan can benefit all municipalities.

1984-87 SERVICE PLAN

In response to the performance of the existing system, the transit planning issues described above and the policies outlined in the Strategic Plan, a number of modifications and additions to the urban transit system are recommended. These recommendations fall into two categories, modifications to the base system of the HSR and development of

a bus rapid transit system. The specific changes which are being recommended in each of these categories are presented below.

HSR Base System Modification - Early, 1984

A number of modifications are proposed for the existing base system of the HSR. These modifications can be divided into two groups, those for implementation early in 1984 and those for implementation late in 1984 or beyond. The specific route changes in the first group of modifications are shown in Exhibit 1.1 and are summarized as follows:

- A. the Bayfront and Burlington routes have been integrated. One branch of the route travels on Ottawa Street while another branch serves Burlington.
- B. the Aberdeen route has been extended through the downtown north, along McNab and James Streets and then east along Burlington to intersect with the new Bayfront route;
- C. the Upper James/Claremont route has been integrated with the new Bayfront and existing Upper James routes;
- D. the Fennell route has been re-routed from Ottawa Street to Kenilworth Avenue north of Mountain in order to provide more direct access to the industrial area along Burlington Street;
- E. the Rosedale Avenue branch of the Delaware route has been extended to King's Forest Recreation Area;
- F. the Stoney Creek Barton Stub has been integrated with one branch of the Stoney Creek Central route.

The above changes were approved by Regional Council and were implemented in January, 1984.



- LEGEND**
- Routes operating all day
 - - - Limited Service Routes
 - - - - Rush Hour Routes
 - Summer Schedule only
 - Improved Route change

ROUTES

- 1 KING — Queenston Loop
- 1A KING — Bond & Main
- 2 BARTON — Bell Manor
- 2C BARTON — Osborne & Melvin
- 3 CANNON — Reid & Dunsmuir
- 3A CANNON — Strathairne Loop
- 4 BAYFRONT — Via Beach Road
- 4A BAYFRONT — Burlington Terminal
- 5 DELAWARE — King & Jones
- 5A DELAWARE — Rosedale
- 5B MAIN WEST — C.N.I. B. Building
- 5C WEST HAMILTON — West Hamilton Loop
- 5D UNIVERSITY — McMaster Medical Centre
- 5E DELAWARE — Nash & King
- 6 ABERDEEN NORTH — Franklin & Longwood
- 6A ABERDEEN NORTH — Aberdeen & Longwood
- 7 LOCKE — from Downtown
- 8 YORK — Lamoreaux & Strathcona
- 8A YORK — Holy Sepulchre Cemetery
- 10 SHERMAN
- 11 PARKDALE — Mud Street Loop
- 11A PARKDALE — Mount Albion Loop
- 11B PARKDALE — Greenhill Pump House
- 21 UPPER KENILWORTH
- 22 UPPER OTTAWA — Up/Ottawa & Stone Church
- 22A UPPER OTTAWA — Mud Street Loop
- 22B UPPER OTTAWA — Hamilton Mountain Bowl
- 22C UPPER OTTAWA — Rymal Rd. Loop
- 23 UPPER GAGE — Upper Gage & Rymal
- 23A UPPER SHERMAN — Beaverton
- 24 UPPER SHERMAN — Up/Sherman & Limeridge
- 24A UPPER WENTWORTH — Up/Wentworth & Limeridge
- 25 UPPER WELLINGTON — Up/Well & Jay
- 26A UPPER WELLINGTON — Up/Well & St/Church
- 27 UPPER JAMES — City Limits
- 27A UPPER JAMES — Limeridge Bus Loop
- 27B UPPER JAMES — Mountain Garage
- 31 FENNELL — Upper Paradise & Scenic
- 31A FENNELL — Sanatorium & Garth
- 31B FENNELL — Stone Church & Chesley
- 31C FENNELL — Beach Road Loop
- 31D FENNELL — Gage & Industrial Dr
- 32 GARTH — St. Elizabeth Village
- 32A GARTH — Claudette Gate
- 33 SANATORIUM — Mohawk & Up/Horning
- 33A SANATORIUM — San Antonio & San Remo
- 34 UPPER PARADISE — Rymal Rd. Loop
- 34A UPPER PARADISE — Amali & Up/Horning
- 35 COLLEGE
- 41 MOHAWK — Mohawk & Upper Horning
- 41A MOHAWK — San Brow Building
- 45 STONEY CREEK SALTFLAT COMMUNITY
- 51 SANATORIUM — Taylor & Valleyview (Anc.)
- 51A UNIVERSITY — Taylor & Valleyview (Anc.)
- 52 MAIN WEST — Bond & King (Dundas)
- 52A DUNDAS LOCAL
- 55 STONEY CREEK CENTRAL — Hwy #8 & Jones
- 55A STONEY CREEK CENTRAL — Linn Loop
- 55B STONEY CREEK LOCAL
- 56 CONFEDERATION PARK
- 57 NASH

HSR Base System Modifications - Late, 1984

The changes proposed for implementation late in 1984 and beyond are shown in Exhibit 1.2 and are summarized as follows:

- A. the Upper Kenilworth bus would be diverted from Concession Street to Fennell Avenue between Upper Ottawa and Upper Wellington Street;
- B. the Parkdale route would be extended from its southern terminus east along Mud Street into the section of the Saltfleet community north of Mud Street;
- C. in order to improve east-west travel in the northern section of the Mountain, it is recommended that the Fennell route be diverted to Bendamere Avenue from West 5th Street to Garth Street, at which point the route would extend south to a turnaround at Sanatorium Road. It is recommended that the West 5th Street branch of the Fennell route be connected with the College route to provide an additional north-south through-route between the Mountain and the downtown area. The Upper Paradise Road route would be diverted from Sanatorium Road to Bendamere Avenue between Garth Street and Upper Paradise Road in order to compensate for the re-routing of the Fennell route. In addition, the service on Upper Paradise Road south of Stone Church Road would be shifted to Upper Horning Road in order to improve the penetration of the route into the residential areas west of Upper Paradise Road;
- D. it is recommended that the branch of the Mohawk route serving Sanatorium Road be shifted back onto Mohawk Road in order to improve the east-west service in that area. This recommendation is tied into the expected development of properties to the southwest of Mohawk and Upper Horning Roads;
- E. it is recommended that the route between the Limeridge Mall and Saltfleet community in Stoney creek be extended west from Limeridge Mall to a turnaround at Garth Street in order to provide improved east-west access in that section of the Mountain. This service would be provided in addition to the Upper James route on Limeridge.



LEGEND

- Routes operating all day
- - - Limited Service Routes
- - - Rush Hour Routes
- Summer Schedule only
- Improved Route change

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ROUTES	
1	KING — Queenston Loop
1A	KING — Beland & Main
2	BARTON — Bell Manor
2C	BARTON — Osborne & Melvin
3	CANNON — Reid & Dundas
3A	CANNON — Strathairne Loop
4	BAYFRONT — Via Beach Road
4A	BAYFRONT — Burlington Terminal
5	DELAWARE — King & Jones
5A	DELAWARE — Roseville
5B	MAIN WEST — C.N.I.B. Building
5C	WEST HAMILTON — West Hamilton Loop
5D	UNIVERSITY — McMaster Medical Centre
5E	DELAWARE — Nash & King
6	ABERDEEN NORTH — Franklin & Longwood
6A	ABERDEEN NORTH — Aberdeen & Longwood
7	LOCKE — From Downtown
8	YORK — Lamoreaux & Strathcona
8A	YORK — Holy Sepulchre Cemetery
10	SHERMAN —
11	PARKDALE — Mud Street Loop
11A	PARKDALE — Mount Alton Loop
11B	PARKDALE — Greenhill Pump House
21	UPPER KENILWORTH
22	UPPER OTTAWA — Up/Ottawa & Stone Church
22A	UPPER OTTAWA — Mud Street Loop
22B	UPPER OTTAWA — Hamilton Mountain Bowl
22C	UPPER OTTAWA — Rymal Rd. Loop
23	UPPER GAGE — Upper Gage & Rymal
23A	UPPER GAGE — Upper Gage & Limeridge
24	UPPER SHERMAN — Beaverton
24A	UPPER SHERMAN — Up/Sherman & Limeridge
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31D	FENNELL — Gage & Industrial Dr
32	GARTH — St. Elizabeth Village
32A	GARTH — Claudette Gate
33	SANATORIUM — Mohawk & Up/Horning
33A	SANATORIUM — San Antonio & San Remo
34	UPPER PARADISE — Rymal Rd. Loop
34A	UPPER PARADISE — Amalfi & Up/Horning
35	COLLEGE
41	MOHAWK — Mohawk & Upper Horning
41A	MOHAWK — San Brow Building
45	STONEY CREEK SALTFLAT COMMUNITY
51	SANATORIUM — Taylor & Valleyview (Anc.)
51A	UNIVERSITY — Taylor & Valleyview (Anc.)
52	MAIN WEST — Bond & King (Dundas)
52A	DUNDAS LOCAL
55	STONEY CREEK CENTRAL — Hwy #6 & Jones
55A	STONEY CREEK CENTRAL — Levi Loop
55B	STONEY CREEK LOCAL
56	CONFEDERATION PARK
57	NASH

Development of a Bus Rapid Transit System

A bus rapid transit system is a network of limited-stop express buses which serve major activity centres and transfer points, and which is integrated with the base transit system such that local and express service is provided in the main travel corridors of a region. A demand for this type of service exists in the lower City east-west corridor, the Mountain CBD corridor and the Mountain-Bayfront corridor. Because of the nature of the roads and traffic in these corridors, the development of a bus rapid transit system to serve these corridors will not require dedicated rights-of-way or priority treatment for the express buses. However, the system will require expenditures for articulated buses, shelters and street furniture at transfer points, special signage, and minor traffic engineering modifications. While these expenditures will not be major, a lead time of 9-12 months will be required to design and require the necessary equipment. When coupled with the need to carefully market the bus rapid transit services and to modify the schedules of the local bus service such that they are properly integrated, the development of a bus rapid transit system will need to be staged over about 2 or 3 years. The proposed bus rapid transit routes are shown in Exhibit 1.3. The recommended staging of these routes are summarized as follows:

- A. early in 1985, a bus rapid transit route should be implemented in the lower city east-west corridor between Eastgate Square and McMaster University operating on the same alignment as the King and University routes;
- B. in 1985, a bus rapid transit route should be implemented in Mountain CBD corridor between Stone Church Road to the downtown operating in the same alignment as the Upper James route;
- C. in 1986, a bus rapid transit route should be implemented in the Mountain-Bayfront corridor between the industrial area of the Bayfront and the Mountain with one branch on Fennell extending to Mohawk College and one branch on Gage and Limeridge extending to the Limeridge Mall. Except for the Limeridge Mall branch, the route operates essentially on the same alignment as the Fennell route.



Bus rapid transit should revitalize the urban transit system in the Hamilton-Wentworth region, and should make transit an attractive alternative to the automobile. It will be supportive of the goals of the Official Plan, and should arrest the falling ridership trends on the transit system and, hopefully, cause ridership to increase over the 1985-87 period.

FINANCIAL IMPACT

It is expected that the Service Plan can be implemented without increasing the overall tax burden on regional residents.

This will be possible if the following assumptions can be applied to the financial structure of the urban transit services:

1. That the fare structure and rates will be simplified and will be made consistent with the financial policies established in the Strategic Plan; this means an annual increase in the average fares to at least keep pace with inflation.
2. That unit operating cost increases (operating cost per kilometre) can be held to 5% per annum which is the projected inflation rate. If inflation is higher than this, productivity improvement opportunities have been identified to staff which should enable unit operating cost increases to be kept to this level over the period of the Service Plan.
3. That maintenance improvements will be made in 1984 such that the number of spare buses is reduced. This will enable the Service Plan to be implemented without the need to purchase additional standard diesel buses; five articulated buses, however, will be required in 1985.

A budget forecast for the 1984-87 period of the Service Plan and projected allocation of the 1984 net deficit is given in Exhibit 1.4. The following chapters give the rationale for this budget and the above recommendations.

EXHIBIT 1.4

SERVICE PLAN BUDGET FORECAST

TREND (1984 DOLLARS)	HSR BUDGET					
	1983	1984	1984	1985	1986	1987
POPULATION SERVED	379,000	379,000	379,000	382,000	385,000	388,000
REVENUE PASSENGERS	25,471,512	25,451,000	29,092,000	29,404,000	29,984,000	30,647,000
PASSENGERS PER CAPITA	67	67	77	77	78	79
OPERATING REVENUE	\$14,941,696	\$16,050,000	\$16,050,000	\$17,642,400	\$19,189,760	\$20,839,960
REVENUE PER PASSENGER	\$0.59	\$0.63	\$0.55	\$0.60	\$0.64	\$0.68
TOTAL REVENUE (1)	\$15,280,255	\$16,443,750	\$19,347,750	\$21,214,087	\$22,992,669	\$24,875,124
TOTAL OPERATING COST	\$33,022,101	\$35,605,109	\$35,605,109	\$36,934,189	\$39,192,841	\$41,793,003
REVENUE/COST RATIO	46.3%	46.2%	54.3%	57.4%	58.7%	59.5%
REGIONAL OPERATING DEFICIT	\$17,741,846	\$19,161,359	\$16,257,359	\$15,720,102	\$16,200,173	\$16,917,879
LESS PROVINCIAL SUBSIDY	\$6,501,226	\$7,009,756	\$7,009,756	\$7,161,767	\$7,479,417	\$7,886,357
NET OPERATING DEFICIT	\$11,240,620	\$12,151,603	\$9,247,603	\$8,558,335	\$8,720,756	\$9,031,521
NET DEFICIT PER CAPITA	\$29.66	\$32.06	\$24.40	\$22.40	\$22.65	\$23.28

(1) Includes payments for seniors and other revenue

(2) 1983 Based on existing policy, 1984-87 based on new policy

(3) All cost figures are in inflated dollars assuming an inflation rate of 5%

2. REVIEW OF EXISTING SERVICES

In order to obtain an accurate picture of the performance of the existing transit services an intensive data collection exercise was undertaken by the HSR in the spring and summer of 1983. Since many of these surveys were labour intensive, the HSR would not have been able to collect this data without assistance from a joint Federal/Provincial employment program.

All of the data collected through these surveys is stored on the HSR's computer system. In addition, procedures were developed on the computer system to analyze this data and these procedures are available to the HSR for use in updating the service plan.

IMPORTANT SURVEY RESULTS

The specific surveys which were undertaken as part of the review of HSR services included the following:

- o passenger classification survey;
- o transfer trace;
- o on/off or riding count survey.

The key results from each of these surveys are outlined below.

Passenger Classification Survey

The passenger classification survey determined what proportion of HSR riders used the 11 different fare categories. The results of the survey are summarized in Exhibit 2.1.

EXHIBIT 2.1

PASSENGER CLASSIFICATION SURVEY RESULTS - MAY 1983

ROUTE	ROUTE NAME	ADULT	CHILD	ADULT	CHILD	TICKET	Student	Senior	Adult	Monthly	Senior	Annual	Student	Monthly	Senior	Annual	TRANSFER	CASH	TICKET	PASS	TRANSFER	TOTAL
NUMBER							Senior	Adult					Senior	Adult								
1	KING	21.52	1.22	9.32	0.32	9.32	9.32	20.02	2.12	12.12	14.02	0.22	24.22	22.72	18.92	48.42	10.12	100.02				
2	BARTON	20.42	1.82	13.22	0.42	13.22	13.22	18.82	2.92	12.62	15.82	0.52	26.82	22.22	16.82	50.42	10.42	100.02				
3	CANNON	16.62	2.22	12.22	0.82	12.22	12.22	22.42	0.62	13.22	9.42	0.62	30.92	18.82	22.42	46.12	12.72	100.02				
4	RAYFRONT	15.42	0.92	9.22	0.22	11.72	11.72	20.82	0.82	11.12	9.92	0.42	51.92	16.32	21.12	43.22	19.42	100.02				
5	DELEWARE	18.22	3.02	15.92	0.62	9.22	9.22	21.32	0.92	7.62	8.82	0.72	29.82	21.12	25.62	39.32	14.02	100.02				
6	ABERDEEN	9.92	1.92	9.42	2.82	9.42	9.42	12.42	4.02	34.02	4.22	0.72	33.62	11.82	21.72	55.32	11.32	100.02				
7	LOCKE	15.82	1.62	11.82	0.72	9.92	9.92	18.32	0.82	15.82	11.72	1.02	31.02	17.32	22.52	47.82	12.32	100.02				
8	YORK	15.32	1.62	10.52	0.62	8.32	8.32	19.72	1.12	19.52	8.52	1.12	37.72	16.92	19.42	49.92	13.72	100.02				
10	SHERMAN	16.42	3.62	10.02	0.02	5.72	5.72	35.02	1.12	8.22	2.92	0.02	48.02	20.02	15.72	47.12	17.12	100.02				
11	PARKDALE	14.72	6.22	8.62	0.82	3.92	3.92	21.32	0.62	7.42	12.12	0.02	71.52	20.82	13.32	41.42	24.42	100.02				
21	KENTWORTH	14.82	1.02	18.02	2.02	9.52	9.52	21.22	0.62	11.22	12.52	0.22	20.12	15.82	29.52	45.52	9.12	100.02				
22	UP OTTAWA	14.62	1.82	16.02	1.12	11.82	11.82	17.02	0.42	5.82	13.12	3.42	33.32	16.32	28.72	39.72	15.12	100.02				
23	UP GAGE	16.62	1.82	17.12	1.02	7.32	7.32	19.82	1.42	17.22	6.42	1.52	22.32	18.42	25.42	46.42	9.82	100.02				
24	UP SHERMAN	15.62	2.02	13.92	0.12	8.82	8.82	18.72	0.42	6.92	19.72	0.32	33.62	17.72	22.82	45.92	13.62	100.02				
25	UP KENTWORTH	17.12	1.22	12.52	1.92	11.32	11.32	17.22	0.92	9.42	10.42	0.22	40.62	18.32	25.72	38.22	17.82	100.02				
26	UP WELLINGTON	16.52	0.02	23.52	1.22	9.42	9.42	20.02	1.22	9.42	9.42	1.22	16.32	16.52	34.12	41.22	8.22	100.02				
27	UP JAMES	13.72	4.62	13.72	0.02	10.72	10.72	21.42	0.42	5.72	5.32	0.82	55.42	18.32	24.42	33.62	23.72	100.02				
31	FENWELL	13.22	4.02	13.32	1.12	7.52	7.52	14.82	1.12	9.12	10.32	4.52	54.32	17.22	21.82	39.82	21.22	100.02				
32	GARTH	16.02	1.72	17.72	0.32	11.92	11.92	14.22	1.02	8.82	10.92	2.92	30.52	17.72	29.92	37.82	14.52	100.02				
33	SANATORIUM	16.22	0.82	18.82	0.42	9.32	9.32	20.92	1.32	11.02	8.72	0.32	27.22	17.02	28.52	42.22	12.42	100.02				
34	UP PARADISE	14.02	1.52	16.72	1.22	15.12	15.12	10.22	1.12	13.72	10.42	4.22	24.82	15.52	32.92	39.62	12.02	100.02				
35	COLLEGE	9.72	0.22	28.02	0.12	0.92	0.92	17.72	2.62	3.02	0.02	22.82	38.32	10.02	29.12	46.02	14.92	100.02				
41	MOHAWK	16.82	7.12	11.82	1.82	12.12	12.12	10.72	0.52	6.02	15.72	1.12	32.92	23.92	25.72	34.02	16.32	100.02				
45	S C SALFLEET	19.52	0.52	18.12	0.92	7.92	7.92	15.32	2.12	11.92	13.52	0.02	21.82	20.02	27.02	42.82	10.22	100.02				
52	MAIN W/DUNDAS	17.22	8.22	15.52	1.72	9.32	9.32	16.92	0.92	4.52	9.02	0.82	30.42	25.52	26.62	32.12	15.82	100.02				
53	BURLINGTON	48.22	1.42	8.72	0.02	5.62	5.62	15.12	0.42	2.72	12.02	0.02	9.22	49.62	14.32	30.32	5.92	100.02				
55	STONEY CREEK	17.62	2.12	6.62	0.52	18.82	18.82	10.32	0.12	1.22	24.22	1.82	37.02	19.72	25.92	37.52	16.92	100.02				
56	CONFEDERATION P	13.72	0.72	17.52	0.82	7.62	7.62	22.32	0.82	13.32	11.72	0.82	26.42	14.42	26.02	48.92	10.72	100.02				
57	NASH	15.22	4.62	10.12	1.32	9.02	9.02	12.52	0.52	3.22	20.22	0.42	57.52	19.82	20.42	36.72	23.12	100.02				
GRAND TOTAL																						
		16.62	2.32	13.62	0.82	9.12	9.12	18.12	1.12	10.82	11.62	1.72	33.42	18.92	23.62	43.32	14.22	100.02				

(1) McMaster passes were not in use in May and therefore were not covered in this survey

The key points to note from the exhibit are as follows:

- o data on McMaster pass utilization was not available since the surveys were conducted in May after the end of the regular University session. A survey to determine McMaster University fare characteristics and riding habits was undertaken and the results of this survey are discussed later;
- o over 40% of boardings on HSR buses are by pass holders. Approximately half of this group use adult passes; annual senior and student pass users make up most of the remainder of this group;
- o the transfer rate, as measured by the number of transfers versus the number of cash and ticket ons, is approximately 33%. This means that on average, 1 out of every 3 transit riders transfers during their trip. Exhibit 2.1 shows that on many of the Mountain routes the transfer rate is higher than average, while on the major east-west routes the transfer rate is lower than average.

The results of the passenger classification survey were also used to determine pass utilization. Exhibit 2.2 shows the average number of boardings made by each type of pass holder during the month of May. These boardings were converted to one-way trips using the system transfer rate. In addition, the average fare received from each pass user per trip was calculated based on current pass prices. The corresponding ticket and cash fares are also shown in the exhibit for the purposes of comparison.

The relative use of the different fare categories shown in Exhibit 2.2 reflects the May, 1983 situation. Subsequent changes in the overall fare structure and additional changes planned for the future will affect the relative usage of different fare categories. In addition, pass utilization may be affected by changes in the relative price levels of cash fares, tickets and passes. It is recommended that a fare classification survey be undertaken after the implementation of major fare changes in order to obtain new data on fare usage.

EXHIBIT 2.2

PASS UTILIZATION

PASS TYPE	I	PASSES IN MAY	MAY PASS RIDERSHIP	RIDES/PASS		PASS PRICE	COST/RIDE	
				ONS	TRIPS		ONS	TRIPS
ADULT	I	8,380	592,836	71	53	\$28.00	\$0.40	\$0.53
STUDENT	I	5,025	378,865	75	56	15.00	0.20	0.27
SENIOR (MTH)	I	429	48,049	112	84	15.00	0.13	0.18
SENIOR (ANN)	I	10,905	341,289	31	23	1.50	0.05	0.06
MOHAWK	I	504	55,533	110	83	24.00	0.22	0.29
	I	-----	-----	-----	-----	-----	-----	-----
TOTALS/AVERAGES	I	25,243	1,416,572	56	42	\$13.66	\$0.24	\$0.33

Until the results of the next fare classification survey are available, HSR should use the following assumptions to determine ridership:

- o the average cash fare is equal to $0.88 \times \text{Adult cash fare} + 0.12 \times \text{Child cash fare}$;
- o pass utilization follows the breakdown presented in Exhibit 2.2.

The results of this survey and the on-off survey determined earlier indicate that the HSR has been underestimating transit ridership by approximately 15%. For example, based on survey results, May ridership was approximately 2.43 million passengers versus an HSR estimate of 2.07 million passengers. The reasons for this difference are as follows:

- o the HSR has not been accounting for ridership by passengers using annual senior passes;
- o the HSR has been underestimating cash fare ridership since it was assumed that all cash fares were adult fares;
- o the HSR has been underestimating pass utilization.

The HSR should use the results of the classification survey in order to recalculate ridership statistics for 1984 and thereafter. It may not be possible to recalculate statistics from earlier years due to different fare structures and pass utilization. The new ridership figures will not change revenues but will change the average fare per rider.

Transfer Trace

An analysis was performed of the transfers collected by route on a typical weekday. The results of this analysis indicated that over 50% of the transfers were between routes serving the Mountain and the east-west routes in the lower part of the City. Most of these transfers were to and from the Barton, Delaware, King, and to a lesser extent the Bayfront

routes. No single pair of Mountain and other routes have a transfer volume sufficiently high to warrant connection of service; however, the high volumes of transfers indicates that the close coordination of Mountain and major east-west routes in the downtown area is very necessary.

In addition to the high transfer rates on the Mountain routes, there are high levels of transfers between the following pairs of routes:

- o King and Delaware;
- o King and Stoney Creek;
- o Barton and Parkdale;
- o Barton and King;
- o Barton and Delaware.

The high number of transfers between the above routes is not surprising since these routes generally have the highest ridership in the system. There is some potential for interconnecting some of these route pairs, particularly the King and Delaware routes. The specific services proposed later in this plan address this issue.

On/Off or Riding Counting Survey Results

The on/off or riding count survey provided very detailed information on the ridership of each of the routes in the transit system. These results were used to determine vehicle loadings, stop activity and loadings by time of day. This information was then used to determine both the performance of individual routes in terms of revenue cost ratio, revenue per kilometer and passengers per kilometer as well as to determine the extent to which the headways on each route fall within the headway policies outlined in the Strategic Plan. The results of the route performance analysis are presented in the following section of the Service Plan while the results of the headway analysis, a computerized procedure on the HSR computer system, are presented in Chapter 5 of this report.

McMaster Survey Results

A small survey of McMaster students was performed early in December, 1983 to determine the transit characteristics of this group. The major findings of the survey were as follows:

- o the fare categories used by those surveyed were:
pass-70%; tickets-20%; cash-10%;
- o pass users make an average of 54 transit trips per month, ticket users travel 32 times per month on transit while cash users make only 18 transit trips per month;
- o approximately one half of the riders surveyed transfer during their transit trip to or from McMaster University;
- o the greatest number of transfers were to the King route. Significant numbers of transfers were also made to the Barton, Aberdeen and Upper James routes;
- o approximately 65% of the transit users surveyed live in an area bounded by the Barton Street, Ottawa Street, the Mountain brow and Highway 403. Approximately 20% live on the mountain;
- o McMaster transit pass users make approximately 105,000 transit trips per month during the school year versus approximately 2.6 million trips per month system-wide;
- o transit trips to McMaster University greatly impact the utilization of the University and Delaware routes. Demand on these routes during the school year is approximately 25% higher than during periods when the University is not in session. Demand on other routes increases by less than 10%.

ANALYSIS OF ROUTE AND SYSTEM PERFORMANCE

Based on the data collected in the surveys described above and on the farebox data regularly collected by the HSR, the performance of the different routes in the transit system was determined. Route performance was measured by the following three variables:

- o revenue/cost ratio;
- o revenue per kilometer;
- o passengers per kilometer.

The first two measures are strongly influenced by the fare policy of the transit system and therefore our examination of the routes focused on the passengers per kilometer measure. Exhibit 2.3 presents the performance of the routes when ranked by passengers per kilometer. Given the transit system's service population of approximately 380,000, a value of 1.5 passengers per kilometer could be considered to represent adequate performance on any given urban transit route. The 14 routes whose performance falls below this value generally have the common trait of serving the fringes of the urbanized area of the Region. In these areas, the population density is typically lower and auto ownership is typically higher than the more central areas.

There are a number of urban routes which also have revenue passengers per kilometer of less than 1.5. These routes, which include Sherman, Claremont and Fennell have poor performance for other reasons. The Sherman and Claremont routes operate during rush hours only at relatively low frequencies in areas where there are alternative routes with much higher levels of service. Given this situation, it is very difficult for the route to attract ridership on a consistent basis. The Fennell route has poor performance due to a significant proportion of unproductive mileage on the Kenilworth access and circuitous routing in the western section of the mountain.

Although many of the factors contributing to the poor performance on these routes is beyond the control of the transit system, it is possible to improve performance by more closely tailoring the services offered to the passenger demands. This could be achieved through adjustments to headways, reducing the penetration of routes into the outlying areas and reducing or eliminating rush hour only routes in areas where regular

EXHIBIT 2.3

HSR REVENUE/COST BY ROUTE SORTED BY REVENUE PASSENGERS/KM. - MAY 1983

ROUTE NAME	ROUTE NUMBER	CASH	TICKET	PASS	TRANSFER	TOTAL	TRANS.	TRANSFER	MULTI-RIDE	SINGLE RIDE	AVERAGE FARES	MULTI-RIDE	SINGLE RIDE	TOTAL OPERATING	KMS	TOTAL COST	REVENUE / COST	REVENUE / KM	FAS\$/KM
KING	1	103,026	108,893	303,605	57,636	573,159	57,196	2.01	137,655	377,868	\$0.24	\$0.48	\$13,740	\$227,409	123,432	\$332,755	0.683	\$1.84	3.85
BARTON	2	107,736	91,190	302,720	58,461	560,107	60,310	1.96	154,641	347,005	0.24	0.48	14,127	216,644	123,388	332,578	0.651	1.76	3.69
YORK	8	7,899	8,655	25,433	6,679	48,666	7,242	1.92	19,919	22,067	0.23	0.43	1,508	15,586	13,147	27,105	0.575	1.19	2.73
LOCKE	7	10,322	12,183	31,153	7,646	61,953	8,248	1.93	20,706	33,602	0.23	0.45	1,775	21,618	19,579	40,367	0.536	1.10	2.47
UP GAGE	23	20,449	29,242	67,569	12,689	129,949	14,140	1.90	32,245	85,015	0.25	0.47	3,119	39,648	47,112	97,131	0.522	1.08	2.31
CANNON	3	25,270	28,705	48,079	14,854	116,909	13,392	2.11	32,523	69,531	0.22	0.47	3,322	43,389	42,627	87,884	0.494	1.02	2.16
UP WELLINGTON	26	10,203	16,593	40,280	6,020	73,095	8,034	1.75	15,881	51,194	0.29	0.51	1,756	26,129	29,699	61,230	0.531	1.09	2.15
UNIVERSITY	50	11,919	19,441	22,694	8,763	62,817	6,927	2.27	14,821	39,233	0.23	0.51	1,974	25,336	23,411	48,296	0.525	1.08	2.12
ABERDEEN	6	9,019	15,655	36,589	7,766	69,029	7,403	2.05	22,117	39,147	0.16	0.34	1,275	13,168	18,074	55,553	0.325	0.67	1.99
UP KENILWORTH	21	14,905	24,743	38,185	7,801	85,634	7,969	1.98	17,576	60,257	0.24	0.48	1,885	34,936	37,507	77,329	0.452	0.93	1.95
UP SHERMAN	24	14,985	24,880	45,321	13,427	98,613	12,004	2.12	29,643	55,543	0.23	0.48	3,038	36,365	39,142	80,700	0.451	0.93	1.94
UP WENTWORTH	25	14,611	23,704	31,531	15,167	85,013	13,856	2.09	31,509	38,337	0.23	0.48	3,511	29,391	32,448	66,898	0.439	0.91	1.87
DELEWARE	5	88,986	116,448	155,735	58,551	419,721	53,616	2.09	114,720	246,449	0.24	0.51	14,283	168,045	187,215	385,983	0.435	0.90	1.76
COLLEGE	35	1,500	2,787	4,568	1,556	10,411	1,679	1.93	4,302	4,553	0.26	0.51	1,136	2,317	4,360	8,994	0.430	0.89	1.74
GARTH	32	11,009	16,300	23,098	8,571	58,978	9,227	1.93	19,374	31,033	0.25	0.49	2,167	22,200	26,639	54,956	0.404	0.83	1.71
MOHAWK	41	13,082	25,183	35,894	14,486	88,646	12,979	2.12	26,149	48,010	0.22	0.46	3,180	31,221	41,758	86,144	0.362	0.75	1.61
UP JAMES	27	26,486	37,074	26,748	27,996	118,304	20,076	2.39	46,964	43,345	0.21	0.51	5,940	37,926	47,451	97,831	0.388	0.80	1.57
NASH	57	8,828	12,192	20,040	12,356	53,417	10,890	2.13	27,080	13,980	0.22	0.47	2,726	15,282	20,773	42,855	0.357	0.74	1.56
BAFFONT	4	27,704	32,418	57,479	28,324	145,925	26,839	2.06	71,785	45,817	0.23	0.47	6,497	44,565	63,279	130,444	0.342	0.70	1.49
UP PARADISE	34	6,180	10,298	14,353	4,200	35,030	4,646	1.90	9,601	21,230	0.23	0.45	984	12,702	19,236	39,684	0.320	0.66	1.48
SHAMATORIUM	33	8,953	15,955	28,219	7,487	60,614	8,063	1.93	17,734	35,393	0.26	0.50	1,934	24,145	33,898	69,929	0.345	0.71	1.43
S C BARTON	55C	570	725	1,348	536	3,180	601	1.89	1,317	1,327	0.25	0.47	133	1,085	1,690	3,486	0.311	0.64	1.36
UP OTTAWA	22	15,620	25,498	26,634	12,034	79,786	10,759	2.12	23,778	43,974	0.23	0.49	2,770	29,688	45,227	93,246	0.318	0.66	1.35
PARKDALE	11	12,104	16,839	48,868	25,130	102,941	19,412	2.29	56,836	20,975	0.21	0.47	5,181	26,823	42,171	86,945	0.309	0.64	1.34
S C LOCAL	55B	2,489	3,608	3,174	1,881	11,152	1,414	2.33	3,099	6,172	0.20	0.47	380	3,908	6,529	13,469	0.290	0.60	1.27
S C CENTRAL	55	3,338	2,837	9,465	3,174	18,814	4,501	1.71	9,864	5,776	0.28	0.47	875	6,313	11,430	23,579	0.268	0.55	1.17
S C SALFLEET	45	2,846	3,147	9,266	1,739	16,998	2,285	1.76	4,864	10,395	0.28	0.49	483	6,973	13,082	26,988	0.257	0.53	1.08
RUNDAS LOCAL	52A	505	887	1,522	549	3,463	568	1.97	1,092	1,823	0.25	0.50	140	1,331	2,573	5,309	0.251	0.52	1.03
FENNELL	31	22,091	34,293	49,032	28,313	133,729	23,378	2.21	59,921	45,495	0.21	0.46	5,874	39,178	83,676	172,620	0.227	0.47	1.02
CLAREMONT	27B	1,265	3,183	2,032	2,009	8,489	934	3.15	2,185	4,295	0.16	0.51	324	2,182	6,252	12,898	0.222	0.46	0.90
SHERMAN	10	451	545	1,627	543	3,166	491	2.11	1,375	1,249	0.25	0.52	134	1,119	2,771	5,714	0.196	0.40	0.78
RURLINGTON	53	16,404	4,275	4,803	1,593	27,075	1,425	2.12	2,231	23,251	0.29	0.62	466	15,527	32,517	67,081	0.231	0.48	0.77
GRAND TOTAL		620,757	769,026	1,517,067	457,935	3,364,785	430,504	2.06	1,033,509	1,873,341	0.23	0.47	\$105,911	\$900,941	\$1,250,954	\$2,735,980	0.456	1.00	2.10

transit services are adequate. In addition, the realignment of some of the routes would improve service levels with no increase in vehicle kilometres or reduce vehicle kilometres with no change in the level of service provided to transit passengers.

Exhibit 2.3 also presents the various performance measures on a system-wide basis. The revenue/cost ratio for the system of 0.46 is relatively low when compared with other Canadian transit properties of similar size. On the other hand, the system-wide revenue passengers per kilometer of 2.1 compares favourably with Canadian transit properties serving population groups of 250,000 to 500,000 people. These properties had an average of 1.74 revenue passengers per revenue kilometer in 1982.

The low revenue cost ratio of the Hamilton/Wentworth transit system can be attributed to the following factors:

- o a fare policy which heavily discounts pass user fares and senior and student fares. As a result of this policy, the average fare per revenue passenger in May, 1983 was only \$0.47 or less than 60% of the regular adult cash fare;
- o a mismatch between passenger demand and services supplied on some of the routes in the system.

1977 to 1982 Change in Population by Planning Division

Planning and Development Department
Hamilton-Wentworth Region



Not to Scale

Aug. 1983

3. LAND USE TRENDS

POPULATION TRENDS

Over the period 1970 through 1982, the population growth rate in the Region of Hamilton-Wentworth has ranged from a high of 1.2% in 1971 to a low of -1% in 1978 with an average of approximately 0.5%. The latest figures available show that the growth rate from 1980 to 1982 in the Region was 0.5% per year and that the population in 1982 was 414,643. Based on population projections prepared by the Regional staff, the population growth rate in the Region is expected to be in the range of .3% to .4% per year.

The geographic distribution of population growth and decline over the last five years is illustrated in Exhibit 3.1. As shown in the exhibit, the areas of highest growth have been to the east of the Red Creek Valley and south of Limeridge Road. Decreases in population have occurred in the lower part of the City of Hamilton as well as the older sections of the Mountain. These decreases in population are mainly due to decreasing household size. Over the six year period from 1976 to 1982 the number of persons per occupied dwelling unit in the Region fell from almost 3 to 2.75. The "Housing and Population Monitoring Report 1982/83" published by the Planning and Development Department of the Region states that:

"a continued decline in the average household size and an increase in the number of persons in the active family formation age groups will result in a continued demand for housing (particularly smaller rental units) in the short term."

It is important to note that although the population of the Region has been relatively stable and is expected to remain so, the age and geographic distributions of the population are continuously shifting. Exhibit 3.2 shows the age distribution of the Regional population as of 1982. Given this age distribution, there will be a drop in the student population of approximately 15% over the next five years. At the same time the population of young adults will increase somewhat and there will be a large increase in the number of senior citizens.

These trends will cause a shift in demand from school-destined to work-destined trips during the peak periods. In addition, the increase in the senior citizens population may increase the proportion of low fare passengers on the transit system, although this increase would likely occur throughout the day and not be concentrated during the peak hours.

The regional transit system will have to respond to these trends by ensuring that major areas of employment are well connected to areas where high and medium density housing are being developed.

EXHIBIT 3.2

Age Distribution of Regional
Population - 1982

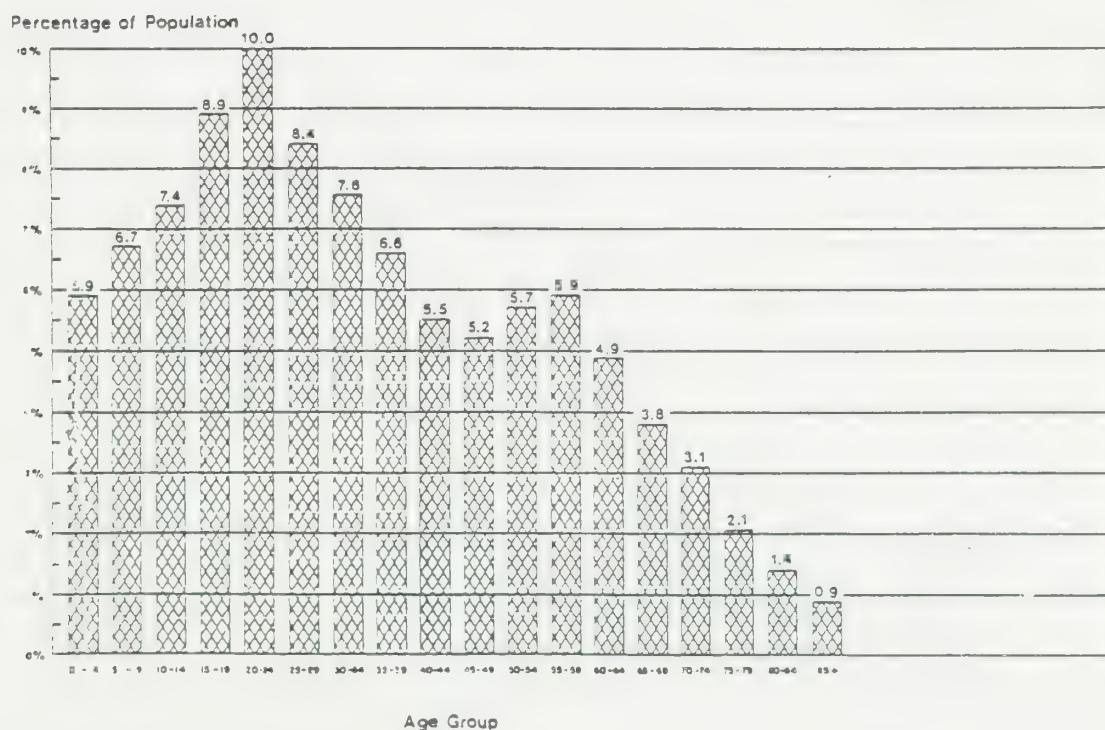
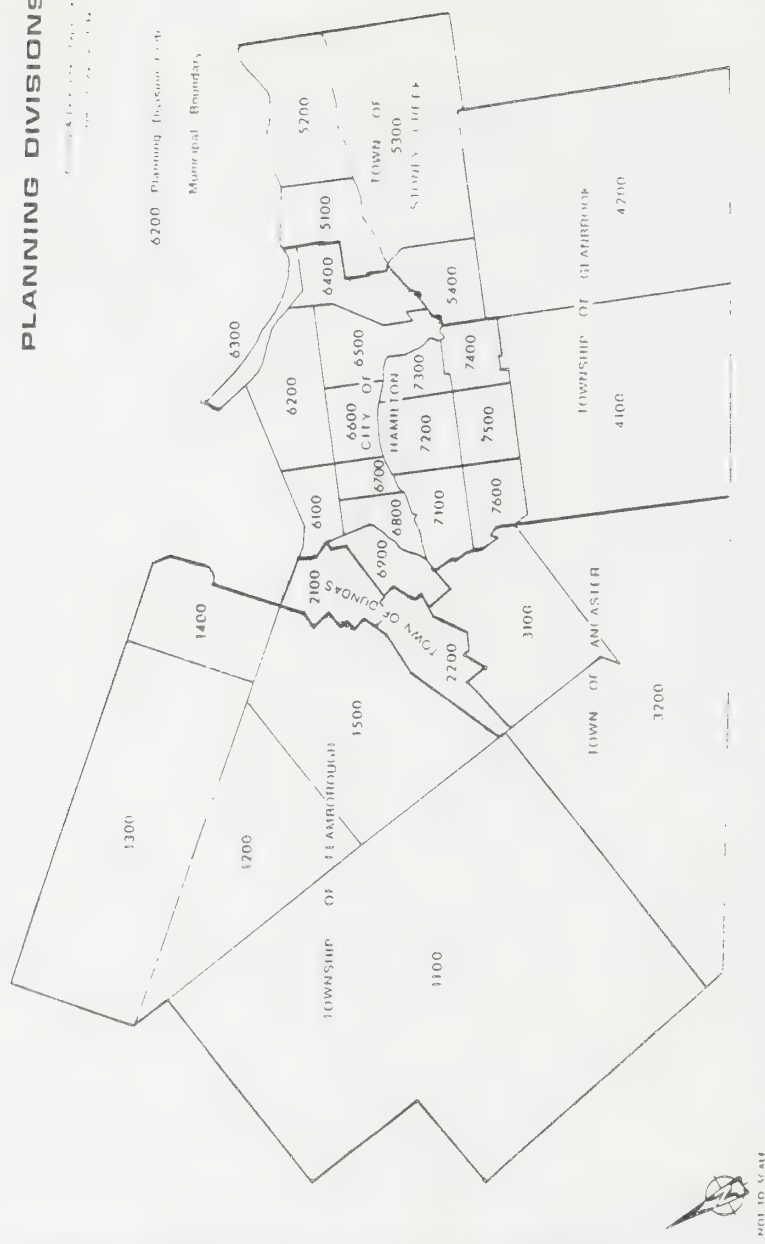


EXHIBIT 3.3

EMPLOYMENT TRENDS

<u>Municipality</u>	<u>Planning Division</u>	<u>1982 Employment</u>
<u>Ancaster</u>	3100	2,565
	3200	1,857 708
<u>Dundas</u>	2100	4,453
	2200	229
		4,224
<u>Flamborough</u>	1100	4,681
	1200	1,159
	1300	331
	1400	465
	1500	1,390
		1,336
<u>Glantrock</u>	4100	1,313
	4200	844
		469
<u>Hamilton</u>	6100	150,176
	6200	2,127
	6300	45,817
	6400	294
	6500	10,098
	6600	9,221
	6700	16,598
	6800	29,324
	6900	5,761
	7100	11,493
	7200	5,503
	7300	9,916
	7400	1,643
<u>Stoney Creek</u>	7500	1,241
	7600	568
		504
	5100	12,101
	5200	9,252
	5300	2,251
	5400	337
		261

PLANNING DIVISIONS



EMPLOYMENT TRENDS

Employment in the Region has grown over the last 10 years at a somewhat higher rate than population. Based on preliminary output from the 1982 Employment Survey undertaken by the Planning and Development Department of the Region, the annual growth rate in employment in the Region over the period 1971 to 1982 was 1%. Approximately two-thirds of this growth occurred within the City of Hamilton, while most of the remaining growth occurred in the municipalities of Stoney Creek and Flamborough.

Exhibit 3.3 presents the 1982 employment by planning division. These employment estimates indicate that the City of Hamilton accounts for over 85% of the total employment in the Region. Almost one-third of the City's employment is located in the Bayfront area, while approximately another third is located in the central area. The remaining employment in the City is dispersed throughout the different planning divisions, although employment south of Limeridge Road is relatively low. Outside of the City of Hamilton, the only major concentration of employment is in the northwest section of the Town of Stoney Creek.

TRANSPORTATION TRENDS

This section deals with transit trip and person trip origin/destination information in the Hamilton area and how this information was used to develop and identify transit trip corridors. The three basic items of information used were the recent transit origin/destination table produced in the R. T. Kelly study, the Region's base p.m. peak hour person trip table and the most recently developed work of the Regional Planning Department relating to place of residence - place of work.

Transit Trip Origins and Destinations

The R. T. Kelly study produced a new transit origin/destination trip table. The table was developed to a new 14 zone system that was sufficiently accurate to represent travel patterns, if not representative

daily transit volumes. The data was used to help identify strong transit travel linkages and when all significant transit travel interchanges were plotted - two corridors emerged: the lower City east-west corridor and the Central Mountain/CBD corridor.

These patterns were explored further by building various corridors and sub-corridors throughout Hamilton. It was found that the lower City east-west transit corridor was very strong between Eastgate Square and MacMaster University. The corridor which contains such routes as King, Delaware, Cannon and Barton has links carrying as much as 20% of the transit travel in Hamilton.

Various Mountain to CBD or Mountain to lower City transit travel patterns were reviewed including corridors between the Central Mountain and the Bayfront, the Central Mountain and the downtown and cross-Mountain corridors to the Bayfront which used a non-CBD routing. The strongest existing transit use pattern from the Mountain remains the Mountain to CBD link which could attract as much as 15% of the transit trips during the period on its peak link. Lower transit demands existed for the Mountain-Bayfront and cross-Mountain-Bayfront transit corridors. However, that is likely a function of transit service patterns rather than potential demands.

The transit demand for a cross-Mountain corridor was also reviewed and it was found that the demand was very weak.

Person Trip Demand

Person trip demand as provided by the Region was reviewed in terms of developing corridor travel measures that could identify travel potential not shown in the transit origin/destination patterns. Using the p.m. peak hour person trip table, a series of six broad travel corridors in the Hamilton area were identified on the basis of a review of patterns shown in the trip table. These corridors included the following:

- o an east-west corridor running between Dundas and Stoney Creek through the lower City;
- o a west corridor running between Dundas and the CBD;
- o a Mountain/CBD/CBD Fringe corridor which connects the Mountain, the downtown and the CBD fringe area as far east as Gage;
- o a cross-Mountain corridor basically running along Mohawk from 403 to Kenilworth;
- o a Mountain/industrial corridor joining the Mountain, CBD and Bayfront areas;
- o a cross-Mountain/industrial corridor running generally along Fennell and Kenilworth to the industrial area.

Five measures were developed to quantify the travel patterns and assist in identifying corridors with transit potential. First, the percentage of trips made in the corridor which were intrazonal were identified as a percentage of total corridor travel. This was done because these trips tend to be relatively short and are not suitable for express transit services. The second measure was the percentage of multi-zonal trips made in the corridor and was expressed as a percentage of total corridor travel. This measure is important because these trips tend to be relatively longer and are considered candidates for shifts to express transit. The third measure was the average trip distance in the corridor and was calculated on the basis of the travel patterns and distances in the corridor itself. The fourth evaluation measure identified the percentage of trips with a major common destination in the corridor. The fifth and final evaluation measure used was the relative magnitude of travel in the corridor. This magnitude is expressed as an index with 1.0 being the maximum.

The summary of the findings is shown in Exhibit 3.4, Corridor Travel Patterns. For a corridor to have significant transit potential, it is felt that the relative magnitude of travel and average trip length are important indicators. The larger the relative magnitude of travel and the longer the trip length, the more prone the corridor would be to developing

EXHIBIT 3.4

CORRIDOR TRAVEL PATTERNS - PERSON TRIPS

CORRIDOR	CORRIDOR					
	EAST-WEST LOWER CITY	WEST LOWER CITY	MOUNTAIN-CBD EAST FRINGE	CROSS MOUNTAIN	MOUNTAIN-CBD BAYFRONT	CROSS MOUNTAIN BAY FRONT
% Intrazonal Trips	21	25	9	44	17	16
% Multizonal Trips	79	75	91	56	83	84
Average Trip Distance	2.3 mi.	1.8 mi.	3.9 mi.	2.1 mi.	3.0 mi.	3.6 mi.
% Trips to Major Destination	64 CBD	81 CBD	91 CBD, Fringe	0	14 industrial 67 CBD	28 industrial
Relative Magnitude of Travel	0.95	0.40	0.70	0.14	1.00	0.43

ridership for higher level transit services. It is of lesser importance that the percentage of multi-zone trips should be relatively high and that the trips to major destinations should be highly concentrated in order to encourage the use of higher level transit services in the corridor. On this basis, it was felt that the east-west corridor in the lower City, the Mountain/CBD corridor, and a Mountain/industrial corridor merited further examination as major potential transit corridors. It was clear that the potential for developing a cross-Mountain or western transit corridors would be fairly limited based on the factors shown in Exhibit 3.4 - particularly relative travel magnitude and average trip distance, both of which are very low.

Recent Regional Surveys

The Regional Planning Department has recently completed a number of employee surveys throughout the Region. Of particular interest to this study was the development of a table showing the relationship between place of work and place of residence and a table indicating the evening peak hour mode splits between home and work zones in Hamilton. This data is covered in a report issued by the Region and is not be reproduced here. Suffice to say that the largest single work zone in Hamilton is the Bayfront with almost 45,000 jobs. This is followed by the CBD and the CBD fringe with 30,000 and 20,000 jobs respectively. From these zones, employment falls off rapidly to a zone in the lower city's east side and a Central Mountain zone which contain about 14,000 employees each. After that, the employment drops dramatically by zone. The table of place of work/place of residence is interesting in that it identifies a large potential interchange between the three Central Mountain zones and the Bayfront. In total, there appear to be over 15,000 daily one-way trip interchanges between the Mountain and the Bayfront for work trips. Whereas these trips did not show up in the transit trip origin-destination tables, they began to show up in the person-trip tables described earlier in this section. The Region also produced a p.m. peak hour mode split table which indicates that the mode split from the central and western Mountain zones for trips to the industrial area are 7% and 10% respectively. This is a figure that could likely be improved upon. The mode split from the eastern Mountain zone to the Bayfront is 22% in the p.m. peak hour and indicates what can be accomplished with the provision of direct transit service between the Mountain and the Bayfront. The Region's travel research underscores our findings that there is a strong transit corridor potential between the Mountain and the Bayfront, between the Mountain and the downtown and in the lower city east-west corridor.

4. IMPORTANT TRANSIT PLANNING ISSUES

This section summarizes some of the key transit planning issues which were considered during the development of the Service Plan. These issues have been grouped into three categories as follows:

- o service issues;
- o demographic issues;
- o financial issues.

SERVICE ISSUES

- o The major east-west routes in the lower part of the City have high demands throughout the day and high seat turnover. During peak periods the major east-west routes offer an inappropriate level of service for passengers on long trips due to the high frequency of stops along the route. In order to attract additional riders on these routes particularly during the peak periods it is important to reduce average travel time for commuters with long travel distances.
- o Due to the multiple destinations in the lower part of the City, passengers from the Mountain, the have a relatively high transfer rate on transit system. It would be difficult to eliminate these transfers by the use of through routings since desired destinations are dispersed; however, if the transfers can't be eliminated strong emphasis should be placed on maintaining the coordination of the Mountain routes with the major east-west routes.
- o There is also a strong transfer movement between the King route and the Delaware route west of the downtown area. These transfers could be eliminated by the through routing of either the King route or an express service paralleling the King route to McMaster University.

- o Level of service to the industrial area at the Bayfront is generally low, particularly at the eastern end of this area. As in the case of the downtown area, there is a need for more direct transit access to the industrial area from the outlying residential sections of the City and a need for a reduction in transit travel times.
- o The location of the proposed GO-ALRT station in downtown Hamilton will have an important impact on transit route structure in the downtown area. Wherever practicable, the major transit routes which enter the downtown area should directly serve the GO-ALRT station.
- o There is a need for faster express-type bus services which are well integrated with the regular routes of the transit system in order to minimize travel time and maximize the desirability of transit use within the Region.
- o As express bus services are developed, they should be done with regard to Regional Planning Policy.

DEMOGRAPHIC ISSUES

- o The next five years will see a significant shift in the age distribution of the population of the Region. There will be a decrease in the number of students and increases in the number of young adults and senior citizens. These trends will have impacts on the types of transit services demanded by the population of the Region and on the proportion of low fare riders which the transit system is likely to carry.
- o Although the population in the Region has only been growing marginally, there has been a population shift from the older areas of the Region to the newly urbanized areas on the fringes of the City of Hamilton and in Stoney Creek. Employment opportunities have remained concentrated in the Bayfront and downtown areas of the City. Therefore it is important that the transit service plan take into account the potential demand between the suburban areas of the Region and the downtown and Bayfront areas of the City.
- o The population and employment trends experienced over the last five to 10 years are expected to continue into the near future. Therefore, the need for effective transit connections between the suburban areas and the central area of the City will continue to grow.

FINANCIAL ISSUES

- o Because of the high number of senior citizens using the transit system and the expectation that this number will grow in the future, it is important to determine what the regional transit system's role is in serving and subsidizing travel by senior citizens as well as other groups such as students and children.
- o The present service setting and cost sharing arrangements for the HSR limits the Region's ability to improve urban transit services within the area municipalities on a consistent basis. Accordingly, the arrangements will need to be rationalized in order that the Service Plan can benefit all municipalities.

5. MODIFICATIONS TO BASE SYSTEM

This section briefly outlines the changes that are proposed for the base system in response to the performance of the existing system and the policies outlined in the Strategic Plan. Two types of modifications are discussed; changes to headways and changes to route structure. The specific changes proposed are described below.

PROPOSED HEADWAY CHANGES

Exhibit 5.1 lists the approximate headways of the Regional Transit System. These headways were taken from the transit system route guide and represent the headways that were in place at the time of the passenger surveys (May, 1983). Based on these surveys, minimum and maximum policy headways for each hour of the day for each route were calculated. These policy headways were determined from the guidelines presented in the Strategic Plan.

In general, the actual headways were in between the minimum and maximum policy values; however, the actual headways tended to be closer to the minimum values. Exhibit 5.2 presents revised headways for the existing route structure based on the headway policies in the Strategic Plan. These revised headways are also in between the minimum and maximum policy values, but they are closer to the middle of the minimum/maximum range than the headways which existed in May, 1983.

The Saturday and Sunday headways have been adjusted to reflect the headways in effect in January, 1984. Further adjustments have not been made due to the unavailability of the necessary data on Saturday and Sunday ridership.

The impact of modifying the headways as proposed would be a 10% reduction in annual metrage or approximately 130,000 kilometres per month or 1.5 Million kilometres per year. In some cases adjustments to headways

EXHIBIT 5.1

APPROXIMATE HEADWAYS (MAY 1983)

ROUTE NAME	ROUTE NUMBER	AM PEAK 6-9am	MID DAY 9-2pm	PM PEAK 2-6pm	EARLY EVENING 6-9pm	LATE EVENING 9pm	SATURDAY	SUNDAY
KING	1	4	5	4	7	15	7	12
BARTON	2	5	5	4	7	15	7	12
CANNON	3	10	12	10	20	20	12	20
BAYFRONT	4	10	12	10	20	20	12	20
DELEWARE	5	5	10	5	15	15	15	20
ABERDEEN	6	10	15	10	20	20	20	20
LOCKE	7	8	12	8	20	20	20	20
YORK	8	12	12	12	20	20	20	20
SHERMAN	10	30		30				
PARKDALE	11	10	15	10	20	20	20	20
UP KENILWORTH	21	12	20	12	30	20	30	30
UP OTTAWA	22	12	20	15	30	30	30	30
UP GAGE	23	12	15	12	20	40	20	30
UP SHERMAN	24	10	15	10	20	40	20	30
UP WENTWORTH	25	10	15	12	20	20	20	30
UP WELLINGTON	26	12	15	12	15	20	20	30
UP JAMES	27	10	12	10	15	20	20	30
CLAREMONT	27	15		15				
FENNEL	31	10	12	10	15	20	20	30
GARTH	32	15	30	15	30	30	30	40
SANATORIUM	33	15	30	15	30	30	30	30
UP PARADISE	34	15	30	15	30	30	30	
COLLEGE	35	10		20	30			
MOHAWK	41	12	20	12	20	20	20	30
S C SALTFLEET	45	30	30	30			30	
UNIVERSITY	51	10	15	10	20			
DUNDAS LOCAL	52	20		20				
BURLINGTON	53	15	30	30	60	60	60	60
S C BARTON	55	30		20				
S C CENTRAL	55	15	20	15			20	
S C LOCAL	55	30	40	30			40	
NASH	57	10	20	10	20	20	20	30

EXHIBIT 5.2

PROPOSED HEADWAYS

ROUTE NAME	ROUTE NUMBER	AM PEAK 6-9 am	MID DAY 9-2pm	PM PEAK 2-6 pm	EARLY EVENING 6-9 pm	LATE EVENING 9pm	SATURDAY	SUNDAY
KING	1	5	6	4	10	20	10	15
BARTON	2	8	8	6	10	20	10	15
CANNON	3	15	20	10	20	40	20	30
BAYFRONT	4	12	12	12	20	20	20	20
DELEWARE	5	5	10	5	10	15	15	20
ABERDEEN	6	12	20	12	20	40	20	20
LOCKE	7	15	20	15	20	40	20	20
YORK	8	15	15	15	20	20	20	20
SHERMAN	10	30		30				
PARKDALE	11	15	20	15	20	30	20	20
UP KENILWORTH	21	15	20	15	30	40	30	30
UP OTTAWA	22	15	20	15	20	40	30	30
UP GAGE	23	15	20	12	20	40	20	30
UP SHERMAN	24	15	20	15	20	40	20	30
UP WENTWORTH	25	15	20	15	20	40	20	30
UP WELLINGTON	26	15	20	15	20	40	20	30
CLAREMONT	27	30	20	30				
UP JAMES	27	10	15	10	15	20	20	30
FENNEL	31	10	15	10	20	40	20	30
GARTH	32	15	30	15	30	40	30	45
SANATORIUM	33	15	30	15	30	40	30	30
UP PARADISE	34	15	30	15	30	40	30	
COLLEGE	35	10	30	20	30			
MOHAWK	41	15	20	15	30	40	20	30
S C SALTFLEET	45	30	60	30	30		30	
UNIVERSITY	51	10	15	10	20			
DUNDAS LOCAL	52	30		30				60
BURLINGTON	53	24	48	24	60		60	
S C BARTON	55	30	40	30			40	
S C LOCAL	55	40	40	40			20	
S C CENTRAL	55	20	40	20			20	
NASH	57	15	20	15	30	40		30

have already been implemented and therefore the savings in metrage with respect to the current situation may not be as high. The revised headways may not be appropriate in some situations where requirements for timed transfers or the length of the routes dictates the need for specific headways which are shorter than those presented in Exhibit 5.2. These factors were considered in determining the revised headways; however, additional adjustments may be required.

Due to the lead time required to implement a significant number of headway adjustments it may not be possible to introduce the proposed headways until September, 1984. Therefore the expected saving in metrage if the proposed headways are implemented would be approximately 400,000 kilometres in 1984 and 1.0 million kilometres in 1985.

It is difficult to estimate the impact of the proposed headways on transit ridership. The Regional Transit System has a high proportion of captive riders and it is unlikely that the minor headway changes proposed would have any impact on the level of ridership of captive riders. Choice riders use this transit system primarily during the morning and afternoon rush hours. The most significant adjustment to the headways proposed at these time periods is an increase in headways from 12 minutes to 15 minutes on most of the Mountain routes. The implementation of a transit information system scheduled for November 1984 as part of the TICCS program should alleviate the negative impact of any minor headway changes.

The proposed revisions to the headways assume no growth in ridership. If, as a result of modified routings and more intensive marketing, the ridership levels increase, the proposed changes to the headways may not be appropriate. The headway analysis, however, indicates that overall increases in ridership of 5% to 10% could be accommodated without an overall change in the frequency of service. Changes in headways on specific routes may still be required if growth in ridership on these routes is above or below the growth in overall ridership.

EXHIBIT 5.3

IMPACT OF ROUTE MODIFICATIONS (1984)

ROUTE	ADDITIONAL ANNUAL REVENUE KMS	ADDITIONAL ANNUAL REVENUE PASSENGERS
Bayfront/Burlington	(340,000 km))
Aberdeen	(120,000 km)) (20,000) Net
Up. James/Claremont	(100,000 km))
Fennell	15,000 km	Passengers would switch to other routes
Delaware-Rosedale	220,000 km	20,000 due to better Bayfront service
		50,000

TOTALS:

(85,000 km)

50,000 passengers

PROPOSED BASE SYSTEM MODIFICATIONS

A number of modifications are being proposed to the existing base system. These modifications could be divided into two groups, those which can be implemented early in 1984 and those which would be scheduled for implementation late in 1984 or beyond.

The first group of modifications were implemented January 1, 1984 and are summarized as follows (an illustration of the modifications is given in Exhibit 1.1 in Chapter 1):

- o the Bayfront and Burlington routes would be integrated and would run north-south on Victoria and Wellington and east-west along Burlington Street. One branch of the route would go south on Beach Road and Ottawa Street while another branch would serve Burlington Street and then travel along Beach Boulevard to Burlington. This branch would replace the existing Burlington route.
- o the Aberdeen route would be extended through the downtown north along McNab and James Streets and then west along Burlington to intersect with the new Bayfront route.
- o the Upper James/Claremont route would be integrated with the new Bayfront and existing Upper James routes.
- o the Fennell route would be re-routed from Ottawa Street to Kenilworth Avenue north of Mountain in order to provide more direct access to the industrial areas at the Bayfront.
- o the Stoney Creek Central and Barton Stub routes have been combined in order to improve the frequency of service along Barton Street in Stoney Creek.
- o the final modification illustrated on Exhibit 1.1 is a small extension of the Delaware route on the Rosedale Avenue branch of the route.

The estimated impact of these modifications in terms of additional revenue-kilometres and revenue-passengers is presented in Exhibit 5.3.

As shown in the exhibit, these changes are expected to reduce revenue-kilometres by 85,000 for the transit system as well as add 50,000 revenue-passengers.

The changes proposed for implementation late in 1984 and beyond are illustrated in Exhibit 1.2. A description of these changes is provided below:

- o a number of changes to the routes serving the southwest areas of the City of Hamilton are proposed in order to rationalize the east-west legs of these routes. Specifically, it is proposed that the Upper Kenilworth bus be diverted from Concession Street to Fennell Avenue between Upper Ottawa and Upper Wellington Streets. In addition, it is recommended that services on the southern leg of the Upper Ottawa route be concentrated on Stone Church Road as illustrated in Exhibit 1.2;
- o the Parkdale route would be extended from its southern terminus east along Mud Street into the section of the Saltfleet community north of Mud Street. Because of the uncertainty of demand for transit trips between the Saltfleet community and the areas served by the Parkdale and adjacent routes, this modification should be implemented on an experimental basis;
- o in order to improve east-west travel in the northern section of the mountain, it is recommended that the Fennell route travel on Bendmere Avenue from West 5th Street to Garth Street, at which point the route would extend south to a turnaround at Sanatorium Road. It is recommended that the West 5th Street branch of the Fennell route be connected with the College route to provide an additional north-south through-route between the mountain and the downtown area. The Upper Paradise Road route would be diverted from Sanatorium Road to Bendmere Avenue between Garth Street and Upper Paradise Road in order to compensate for the rerouting of the Fennell route. In addition, the service on Upper Paradise Road south of Stone Church Road would be shifted to Upper Horning Road in order to improve the penetration of the route into the residential areas west of Upper Paradise Road;

EXHIBIT 5.4

IMPACT OF ROUTE MODIFICATIONS (Late 1984 and Beyond)

ROUTE	ADDITIONAL ANNUAL REVENUE KMS	ADDITIONAL ANNUAL* REVENUE PASSENGERS
Parkdale	19,000 km	10,000
Upper Kenilworth	Marginal	Marginal
Upper Ottawa	7,000 km	Marginal
Fennell	(55,000 km)	Marginal
West 5th/College	44,000 km	
Upper Paradise	20,000 km	40,000
Mohawk	(62,000 km)	(10,000)
Limeridge	68,000 km	150,000

TOTALS: 41,000 km 190,000 passengers

* Revenue Passenger Figures Reflect Only New Riders to the System.

- o it is recommended that the branch of the Mohawk route serving Sanatorium Road be shifted back onto Mohawk road in order to improve the east-west service in that area. This recommendation is tied to the expected development of properties to the south-west of Mohawk and Upper Horning Roads;
- o it is recommended that the route between the Limeridge Mall and the Saltfleet community in Stoney Creek be extended west from Limeridge Mall to a turn-around at Garth Street in order to provide improved east-west access in that section of the mountain.

The specific location of the turnaround would be determined by planning staff.

The estimated impact of these changes on revenue-kilometres and passengers is presented in Exhibit 5.4. As shown in the exhibit, the expected change in vehicle kilometres is not substantial relative to the expected increase in ridership attributed to the route modifications.

In addition to the route modifications described above further changes may be appropriate to implement in order to improve the co-ordination between the regular transit routes and the express transit routes proposed in the next section of the Service Plan. These additional changes should be developed as part of the detailed specification of the new transit concepts.

6. BUS RAPID TRANSIT

This chapter deals with the development and rationale for a bus rapid transit system. The chapter also outlines the operating concepts in terms of routings, hours of operation, headways and the implications on local service in the same corridors. Later in the chapter the implications of each route will be described. The incremental hours and kilometres required for each express route as well as the incremental savings in kilometres and hours taken from the local parallel service. There will also be an estimate of annual riders using the new express services and an estimate of the passenger "draw down" from the parallel local services.

RATIONALE FOR BUS RAPID TRANSIT

An earlier section of the report dealt with the review of transportation trends in the Hamilton area. That review looked at transit origin-destinations and person-trip origin-destinations as they related to the development of potential high demand transit corridors. The Strategic Plan also identified regional planning policies and objectives related to the development of transit corridors and the desirability to connect subregional centres and other major generators into a cohesive transit network. The corridors that have been identified include an east-west corridor in the lower city, a Central Mountain CBD corridor and a Mountain-industrial corridor. In the process of developing ridership estimates for specific routes within these corridors, it was estimated that the maximum peak hour, peak direction link volumes to be served would be in the range of 200 to 500 persons per hour. This assumes that there would be no major local route restructuring in order to feed corridors such as the Mountain CBD corridor.

At these particular link volume levels, bus rapid transit is the most appropriate and perhaps the only "operating concept" that should be considered. As reported in background papers prepared for the Strategic Plan, hourly design volumes in the range identified for bus rapid transit

EXHIBIT 6.1

SUMMARY TABLE OF BUS RAPID TRANSIT OPTIONS

ROUTE NAME	EXPRESS SERVICE					
	HOURS	HEADWAY	BUSES NEEDED	ANN HRS REQUIRED	ANN KM REQUIRED	ANNUAL RIDERS
King- University	5:30 - 10:00 am 2:00 - 6:00 pm	12 min.	5 Artic	11,500	280,000	880,000
Upper James	6:00 - 10:00 am 2:00 - 6:00 pm	12 min.	3 Diesel	6,200	160,000	380,000
Fennell	5:00 - 10:00 am 2:00 - 6:00 pm	12 min.	4 Diesel	8,600	240,000	535,000
Gage- Kenilwth	5:00 - 9:00 am 2:00 - 6:00 pm	15 min.	3 Diesel	6,400	160,000	

start up (200-500 pphpd) do not justify a higher order system. Higher order systems invariably include substantial infrastructure costs (tracks, roadways, electrification, stations) that can only be justified and offset by peak hour peak direction ridership measuring in the thousands. The application of bus rapid transit in the corridor achieves several operating objectives. First, it permits a rapid increase in the quality of the service in terms of more advantageous travel time for transit. This higher speed travel can be obtained at a substantially lower unit cost simply because the driver is delivering more kilometres per hour on bus rapid transit routes than on local routes. Bus rapid transit routes are relatively easy to implement in terms of their physical and capital requirements and act as a demonstration to the riders and potential riders that a commitment to improved service is being undertaken. The development of bus rapid transit corridors is the first step in an orderly evolution towards higher type transit systems.

DESCRIPTION OF OPTIONS

Exhibit 1.3 (Chapter 1) shows the recommended four express bus routes for a bus rapid transit system in the Region. This section deals with the development of the four routes. It describes the routing, the general rationale for the selection of the route within the corridor, the frequency of service recommended and peak link loadings anticipated. In addition, it comments on the concurrent reduction in service to the local parallel route or routes. A summary of the bus rapid transit options is given in Exhibit 6.1.

East-West Corridor

The east-west corridor would contain one bus rapid transit route: King/Main/University. The King-Main route was selected because of its established high passenger loading, its CBD trip orientation and the express travel speeds that can be developed on King and Main. The King-Main University route would extend from Eastgate Square on the east to McMaster University in the west. This route would begin at an Eastgate Square station with specially designated stops at Nash, Parkdale, Kenilworth, Ottawa, Sherman, Wentworth, Emerald, Wellington, and have stops in the downtown as required. Travelling westerly out of the downtown it is proposed that there be stops at Bay, Queen, Parkdale and at the University itself. It is proposed that the route be serviced with the articulated diesel buses and that the frequency of service be 12 minutes between the hours of 5:30 and 10:00 a.m. and 2:00 to 6:00 p.m. In order not to oversupply the corridor, and to make the provision of express services a little more economically attractive, it is recommended that local services on the King route east of the downtown be reduced by three buses per hour. This would reduce the peak period headways on that particular section of the route to five minutes.

Mountain CBD Corridor

The Upper James route is recommended in the Mountain corridor. This route was selected on a basis of analysis undertaken utilizing data collected during this transit study as well as the detailed information on trip origins and destinations undertaken in the 1981 ICTS study of transit trips crossing the Mountain brow. On the Mountain, two corridors stand out in terms of loading; Upper James and Gage. The Upper James route was selected for express service into the downtown on the basis of higher established load points and extends from Stone Church northward with stops at Limeridge, Mohawk, Fennell (2) and Brucedale before it enters the Jolly Cut and stops at five locations in the lower city on its way into the downtown. It is anticipated that the Upper James route would operate on 12 minute headways between the hours of 6:00 and 10:00 a.m. and 2:00 to 6:00

p.m. It would require three diesel buses dedicated to the express service. It is recommended that the one bus per hour be removed from the local service, resulting in approximate headways of 12 1/2 minutes on the Upper James route and releasing one diesel bus.

Mountain-Industrial Corridor

There are two Mountain routes into the industrial area that were paired for trip forecasting purposes. Based on the significant potential for trip making from the Central Mountain and to the Bayfront area, a limited stop express on Fennell/Kenilworth was identified as well as a new Limeridge-Gage-Kenilworth express route. The Fennell-Limeridge express is proposed to start at Mohawk College with stops at Upper James, Upper Wellington, Upper Wentworth, Upper Sherman, Upper Gage, Upper Ottawa before it traverses the Mountain to run north on Kennelworth with stops at Main, Cannon, Barton and the industrial area itself. It is anticipated that loadings on this express service will be relatively high because of the feeder potential of the north-south Mountain routes. The epxress service would operate on 12 minute headways and would require four diesel buses to operate the schedule. It is recommended that one bus per hour be withdrawn from the existing Fennell route which would result in it having 12 minutes headways. The other Mountain route would be a new route operating basically between Limeridge Mall and the Greater Hamilton Shopping Centre/industrial area. Three specific configurations were reviewed on the Mountain for this route and ultimately a route from the Limeridge Mall along Limeridge, Gage, Fennell, Ottawa, down the mountain and on Kenilworth was selected because of superior trip potential on the Mountain. Begining at Limeridge the express route would have stops at Sherman, Mohawk, Fennell, Upper Ottawa, Queensdale, Main Street, Cannon, Barton. It is anticipated that this route when it begins service would require 15 minute headways which could be provided by three diesel buses. The service would operate between 5:00 and 9:00 a.m. and between 2:00 and 6:00 p.m.

EXHIBIT 6.2

SUMMARY TABLE OF LOCAL SERVICE OFFSET

ROUTE NAME	LOCAL SERVICE OFFSET					
	HEADWAY REDUCTION	NEW HEADWAY	BUSES SAVED	ANN HRS SAVED	ANN KM SAVED	RIDERS SHIFTED
King- University	3 buses/hour	5 minutes	3 Trolley	6,200	117,000	720,000
Upper James	1 bus/hour	12 minutes	1 Diesel	2,300	44,000	270,000
Fennell	1 bus/hour	12 minutes	1 Diesel	3,750	58,000	215,000
Gage- Kenilworth						

IMPACT OF OPTIONS

The bus rapid transit service implications were outlined in Exhibit 6.1. The exhibit indicates the operating characteristics of each of the express bus routes in terms of hours of operation, headways, buses required, incremental kilometres and hours expended on express buses. Exhibit 6.2 shows the impact of the bus rapid transit routes on parallel local services in terms of service reductions and passenger shifts from local to rapid bus operations. It is proposed that the King-University express route and the Upper James express route be implemented first. The operating implications of the King-University route are an incremental increase in annual hours of operation due to express buses of 11,500. This would be offset to some degree by the reduction of local service on the King route only. This reduction in service is the equivalent of 6,200 annual hours. The net impact in terms of additional driver hours for express services on the King-University route is 5,300 operator hours. Significant new mileage will be added by the at King-University express route. It is estimated that approximately 280,000 vehicle kilometres will be operated annually on this express route alone. However it is offset by a reduction of about 117,000 vehicle kilometres of local service on the King route east of downtown for a net increase of about 163,000 vehicle kilometres. It is recommended that the King-University express route operate using five articulated buses. This equipment allocation is partially offset by a savings of three trolley coaches during the hours of operation (5:30-10AM, 2-6PM) of the express services. It is anticipated in the first year of operation that the express service will attract approximately 880,000 annual riders of which over 700,000 are anticipated to come from existing ridership on other routes in the corridor.

The Upper James express route is also recommended to be implemented first. This route, operating on approximately 12 minute headways in the peak periods would require an additional 6,200 vehicle hours of operation on Upper James. This would be partially offset by a 2,300 vehicle hour savings from the local service. It is also anticipated that about 160,000 vehicle kilometres of service annually would be accrued

on the Upper James express route and approximately 44,000 vehicle kilometres would be taken out of local service to offset that increase. It is projected that the Upper James express could operate with a three diesel bus complement while one diesel bus would be removed from the regular Upper James local route. It is anticipated that in the first year of operation, approximately 380,000 passengers would be attracted to the Upper James express. Of these, 270,000 are anticipated to shift from local surface transit. This represents an increase in riders of about 110,000 annually.

While the King-University and the Upper James express routes would be inaugurated in the second year of the plan, continued ridership growth would be anticipated on both routes. It would be normal to anticipate that an annual growth in the range of 5-10% a year would occur for several years after the inauguration of the service. The HSR should be prepared at the end of the first year to make modest increases in service if required during the peak periods of operation. At the end of the second year (the recommended length of time for a fair evaluation of the service) an assessment of the service should be made. A decision to either increase peak period frequencies, insert bus rapid transit services during the base period to fill in the bus rapid transit service gap or both of these measures could then be made.

In order to present the new bus rapid transit service in the best possible light, special care must be taken in demarking express bus stops. Because the number of stops on the express route are limited, there should be a shelter program established at these important bus stop areas. It is anticipated that because the headways are relatively short, and that where transfers do occur the waiting times would be also relatively short, there would appear to be little requirement for street furniture related to the stop area. Also, an energetic program of summer and winter maintenance should be developed to care for those stop areas. It is recommended that the vehicles used in the express service be identified as providing a different service than the other vehicles in the fleet. One manner in which this can be done is by mounting flags or other easily interchangeable insignia on the upper front corners of the buses in the express service.

How to best mark the vehicles and stops might best be left to the marketing arm of the HSR. This is important because of the need to tie marketing themes, colour schemes and information packages together as an integrated product.

The second stage bus rapid transit application is recommended to be the Mountain-industrial service. This express service includes two routes; the new Fennell-Kenilworth express and the proposed Upper Gage-Kenilworth express. These important express transit services, although independent routes, would operate as a service pair. It is projected that the incremental annual hours required for the service will be close to 15,000. There is only a modest opportunity to offset the vehicle hours through a reduction of service on the Fennell route. This reduction in service is approximately 3,700 hours annually. The incremental metrage associated with the development of the express routes from the Mountain to the Bayfront will be approximately 400,000 kilometres annually. This is only partially offset by a service reduction on the Fennell route of 58,000 vehicle kilometres annually. The ridership utilizing these two routes is anticipated to be in the neighbourhood of 530,000 during the first full year of operation. It was estimated that about 215,000 of those riders would shift from existing routes. Like the King-Main and the Upper James bus rapid transit route, it is anticipated that these two Mountain-industrial routes will continue to attract ridership increases in the range of 5-10% for the next three year period.

The marketing techniques utilized successfully in the first two bus rapid transit routes would be applied here. That is, specific demarkation of express bus stops, the provision of shelters, and the development of information packages, advertising and route maps detailing the extent of the service. After the initial year of operation of the Limeridge-Gage-Kenilworth express route, service could be expanded to fill in the gap between the a.m. and p.m. peak periods. This may become necessary because the route will connect two regional shopping centres.

7. FINANCIAL PLAN

This chapter sets out a financial plan for the recommended urban transit services including suggested fare rates and unit operating costs, and forecasts revenue and operating costs for the 1984-87 period.

FARE STRUCTURE AND RATES

The 1983 five year Strategic Plan established the following pricing policies:

1. That tickets should be priced so as not to penalize transit dependent users.
2. that tickets and passes to social service agencies should be priced at the adult fare rate.
3. That premium fares should be charged for express services if the unit costs of these services exceed the average unit costs of the urban transit system.
4. That monthly passes are a convenience to the user and should be priced according to usage.
5. That the rates of fare, for all user categories, should be adjusted annually in keeping with the Region's service setting, cost sharing, and revenue performance policies.

The objective of the above pricing policies is to realize a revenue performance on the urban transit system of 60% of operating costs by 1987.

Pricing Strategies

In order to adhere to the above pricing policies and revenue performance goal, the following strategies are suggested:

- o the use of cash should be discouraged in order to reduce the cost of cash handling;

EXHIBIT 7.1

FARE STRUCTURES

CATEGORY	Actual 1983 Prices	Actual 1984 Prices	1984 Prices Based on Strategy
Cash Fares			
Adult	80¢	85¢	85¢
Child	25¢	30¢	30¢
Ticket Fares			
Adult	10/\$7.00	10/\$7.50	10/\$7.50
Senior	5/\$2.00	5/\$2.25	5/\$2.50
Student	5/\$2.00	5/\$2.25	5/\$2.50
Child	4/\$1.00	5/\$1.50	5/\$2.00
Passes			
Adult	\$28.00	\$30.00	\$33.00
McMaster/Mohawk	\$26.00	\$28.00	\$33.00
Senior	\$15.00	\$17.00	\$22.00
Student	\$15.00	\$17.00	\$22.00
Average Fare	51¢	55¢	60¢
# of different rates	8	8	6

- o the use of tickets, as the basic fare unit, should be encouraged;
- o the use of monthly passes should be encouraged as a convenience to those regular passengers who use the service twice a day or more;
- o the fare categories should be simplified to reduce production and handling costs;
- o the fare rates should be derived from the adult ticket rate which should be set at approximately 65% of the cost to provide a ride for one adult;
- o discounted fare rates for seniors, students and children should be based on a percentage of the adult ticket rate consistent with the Region's revenue performance policies.

Accordingly, it is suggested that there be one cash fare priced at approximately 15% higher than the adult ticket rate, that student and senior citizens receive a 33% discount from the adult ticket rate, and that children receive a 50% discount from the adult ticket rate. In addition, monthly passes should be priced at the equivalent ticket rate based on a usage of 44 trips per month.

Recommended Fare Structure and Rates

Exhibit 7.1 presents the actual fare structures in place at the end of 1983 and at the beginning of 1984. The exhibit also presents the impact of applying the above pricing strategies to the 1984 fare structure and rates.

The current fare rates resulted in an average fare of about 51¢ over all in 1983. The new fare rates applied in January 1984, should give an average fare of approximately 55¢ in 1984. In addition to this increase in fares, it is expected that the HSR will receive in 1984 payment for the annual senior passes given to residents 70 years old and over. This payment will be \$2.9 million in 1984 based on 11,000 passes at \$264.00 per pass.

If the above pricing strategies were applied to the 1984 fare structure, the monthly pass rates would be increased giving an average fare of about 60¢ (1984 dollars) which would be more consistent with the Region's revenue performance policies. Consequently, it should be the goal to achieve these "strategy" rates on a progressive basis over the period of this Service Plan.

COST AND TAX BURDEN

Basic operating statistics for the Service Plan are given in Exhibit 7.2 for each year from 1983 to 1987. Ridership is assumed to grow approximately 4% over the five year period because of the bus rapid transit services. To handle the increased ridership, revenue kilometres will need to grow approximately 5% over the same period.

The exhibit also shows the number of vehicles which will be required for the Service Plan assuming that there will be a small improvement in passenger productivity (passengers per peak vehicle) and fewer spare requirements because of productivity improvements which are expected to be made in the maintenance function. In 1984, it is expected that 28 fewer diesel buses will be required and this should be sufficient to handle most of the growth requirements and some of the vehicle replacement requirements over the 1985 to 1987 period. In 1985, the Service Plan will require the purchase of an additional 5 articulated buses for the bus rapid transit system. Future diesel bus purchases, over the period, should primarily concentrate on replacing those buses which have reached the end of their useful life. A complete vehicle acquisition plan and associated capital expenditures will be given in the Physical Plan.

Forecast of Revenues and Costs

Exhibit 7.3 gives a financial forecast for the expected revenues and costs over the 1983-87 period. Under the trend condition, using inflated dollars, it is estimated that the revenue performance will reach about 56% by 1987 which is lower than the target of 60% in the Strategic

Plan. If fare rates are adjusted to reflect the policies and strategies suggested above, then it should be possible to achieve the revenue performance target of 60% by 1987. Alternatively, it should be possible to improve productivity within the operations of the HSR as a means to forego some of the fare increases (this will depend on in-depth investigations by staff in 1984).

On this basis, the "target" forecast shall be considered as the Financial Plan for the 1984-87 period.

Expected Tax Burden on Area Municipalities

It is likely that the Service Plan, as outlined in the previous chapters, can be accomplished without a further tax burden on local taxpayers. Exhibit 7.4 gives the allocation of the net deficit of the "target" financial forecast to the area municipalities under the assumption that the urban transit area (UTA) will be extended to include the urban portions of Ancaster, Dundas, and Stoney Creek, and that a new cost-sharing policy for regional transit services will be approved which allocates net deficits on the basis of passenger boardings in each municipality. These policies have been set out in the 1983 Strategic Plan.

EXHIBIT 7.2

SERVICE PLAN OPERATING STATISTICS

	HSR BUDGET					
	1983	1984	1984	1985	1986	1987
UTA POPULATION	379,000	379,000	379,000	382,000	385,000	388,000
RIDERSHIP						
BASE SYSTEM	25,471,512	25,451,000	29,092,000	28,144,000	28,061,000	28,543,000
BRT SYSTEM	0	0	0	1,260,000	1,923,000	2,104,000
TOTAL	25,471,512	25,451,000	29,092,000	29,404,000	29,984,000	30,647,000
RIDES PER CAPITA	67	67	77	77	78	79
TOTAL KILOMETRES						
BASE TROLLEYS	3,200,000	3,150,000	3,150,000	2,950,000	2,950,000	2,950,000
BASE DIESELS	11,640,000	11,440,000	11,440,000	11,080,000	10,930,000	11,180,000
BRT DIESELS	0	0	0	440,000	863,000	902,000
TOTAL	14,840,000	14,590,000	14,590,000	14,470,000	14,743,000	15,032,000
PASSENGERS PER KM.	1.72	1.74	1.99	2.03	2.03	2.04
PEAK VEHICLES REQUIRED						
BASE TROLLEYS	48	48	48	45	45	45
BASE DIESELS(STD)	150	150	140	137	136	139
BASE DIESELS(ARTIC)	6	6	6	6	6	6
BRT DIESELS(STD)				3	10	10
BRT DIESELS(ARTIC)				5	5	5
TOTAL	204	204	194	196	202	205
PASSENGERS PER PEAK VEH.	124,860	124,760	150,000	150,300	148,400	149,300
KILOMETERS PER PEAK VEH.	72,745	71,520	75,200	74,000	73,000	73,200
MIN. SPARE REQUIREMENTS						
BASE TROLLEYS	8	8	8	7	7	7
BASE DIESELS(STD)	51	30	28	27	27	28
BRT DIESELS(STD)				2	3	3
TOTAL	59	38	36	36	37	38
MIN. FLEET REQUIREMENTS	263	242	230	232	239	243
EXCESS VEHICLES						
TROLLEYS		0	0	19	19	19
DIESELS(STD)		21	28	22	10	1
TOTAL	0	21	28	41	29	20
1984-1987 SERVICE PLAN GROWTH REQUIREMENTS						
TROLLEYS			0	(4)	0	0
DIESELS(STD)			(33)	1	7	4
DIESELS(ARTIC)			0	5	0	0
1984-1987 VEHICLE REPLACEMENT REQUIREMENTS						
DIESELS(STD)			15	15	15	15
REQUIRED DIESELS(STD) FROM EXCESS FLEET OF 28						
GROWTH			0	1	7	4
REPLACEMENT			5	5	5	5
1984-1987 PRELIMINARY PURCHASING PLAN						
TROLLEYS						
DIESELS(STD)			10	10	10	10
DIESELS(ARTIC)			0	5	0	0

TREND AND TARGET FORECASTS OF SERVICE PLAN FINANCIAL IMPACTS

TREND (1984 DOLLARS)	HSR BUDGET					
	1983	1984	1984	1985	1986	1987
REVENUES						
AVERAGE FARES	\$0.59	\$0.63	\$0.55	\$0.55	\$0.55	\$0.55
OPERATING REVENUE	\$14,941,696	\$16,050,000	\$16,050,000	\$16,222,130	\$16,542,115	\$16,907,890
PAYMENTS FOR SENIORS			\$2,904,000	\$2,904,000	\$2,904,000	\$2,904,000
OTHER REVENUE	\$338,559	\$375,000	\$375,000	\$375,000	\$375,000	\$375,000
TOTAL REVENUE	\$15,280,255	\$16,425,000	\$19,329,000	\$19,501,130	\$19,821,115	\$20,186,890
OPERATING COSTS/KM						
TROLLEYS	\$2.45	\$2.72	\$2.72	\$2.72	\$2.72	\$2.72
DIESELS	\$1.75	\$1.95	\$1.95	\$1.95	\$1.95	\$1.95
EXPRESS(STD)	\$1.40	\$1.56	\$1.56	\$1.56	\$1.56	\$1.56
EXPRESS(ARTIC)	\$1.82	\$2.02	\$2.02	\$2.02	\$2.02	\$2.02
OPERATING COSTS	\$28,251,750	\$30,845,109	\$30,845,109	\$30,415,418	\$30,789,063	\$31,342,367
GENERAL/ADMIN.	\$4,770,350	\$4,760,000	\$4,760,000	\$4,760,000	\$4,760,000	\$4,760,000
TOTAL COSTS	\$33,022,100	\$35,605,109	\$35,605,109	\$35,175,418	\$35,549,063	\$36,102,367
REV./COST RATIO	46.3%	46.1%	54.3%	55.4%	55.8%	55.9%
TOTAL DEFICIT	\$17,741,845	\$19,180,109	\$16,276,109	\$15,674,288	\$15,727,948	\$15,915,477
PROV. SUBSIDY	\$6,501,226	\$7,009,756	\$7,009,756	\$6,925,160	\$6,998,722	\$7,107,654
NET DEFICIT	\$11,240,619	\$12,170,353	\$9,266,353	\$8,749,128	\$8,729,226	\$8,807,823
NET DEF./CAPITA	\$29.66	\$32.11	\$24.45	\$22.90	\$22.67	\$22.70
=====						
TREND (INFLATED DOLLARS)						
REVENUES						
AVERAGE FARES	\$0.59	\$0.63	\$0.55	\$0.58	\$0.61	\$0.64
OPERATING REVENUE	\$14,941,696	\$16,050,000	\$16,050,000	\$17,104,250	\$18,341,155	\$19,666,120
PAYMENTS FOR SENIORS		\$0	\$2,904,000	\$3,061,912	\$3,219,825	\$3,377,737
OTHER REVENUE	\$338,559	\$393,750	\$393,750	\$413,438	\$434,109	\$455,815
TOTAL REVENUE	\$15,280,255	\$16,443,750	\$19,347,750	\$20,579,600	\$21,995,089	\$23,499,673
OPERATING COSTS/KM						
TROLLEYS	\$2.45	\$2.72	\$2.72	\$2.86	\$3.00	\$3.15
DIESELS	\$1.75	\$1.95	\$1.95	\$2.04	\$2.15	\$2.25
EXPRESS(STD)	\$1.40	\$1.56	\$1.56	\$1.63	\$1.72	\$1.80
EXPRESS(ARTIC)	\$1.82	\$2.02	\$2.02	\$2.13	\$2.23	\$2.34
OPERATING COSTS	\$28,251,751	\$30,845,109	\$30,845,109	\$31,936,189	\$33,944,941	\$36,282,708
GENERAL/ADMIN.	\$4,770,350	\$4,760,000	\$4,760,000	\$4,998,000	\$5,247,900	\$5,510,295
TOTAL COSTS	\$33,022,101	\$35,605,109	\$35,605,109	\$36,934,189	\$39,192,841	\$41,793,003
REV./COST RATIO	46.3%	46.2%	54.3%	55.7%	56.1%	56.2%
TOTAL DEFICIT	\$17,741,846	\$19,161,359	\$16,257,359	\$16,354,589	\$17,197,752	\$18,293,330
PROV. SUBSIDY	\$6,501,226	\$7,009,756	\$7,009,756	\$7,271,418	\$7,716,091	\$8,227,997
NET DEFICIT	\$11,240,620	\$12,151,603	\$9,247,603	\$9,083,171	\$9,481,662	\$10,065,333
NET DEF./CAPITA	\$29.66	\$32.06	\$24.40	\$23.78	\$24.63	\$25.94
=====						
TARGET (INFLATED DOLLARS)						
REVENUES						
AVERAGE FARES	\$0.59	\$0.63	\$0.55	\$0.60	\$0.64	\$0.68
OPERATING REVENUE	\$14,941,696	\$16,050,000	\$16,050,000	\$17,642,400	\$19,189,760	\$20,839,960
PAYMENTS FOR SENIORS			\$2,904,000	\$3,158,249	\$3,368,799	\$3,579,349
OTHER REVENUE	\$338,559	\$393,750	\$393,750	\$413,438	\$434,109	\$455,815
TOTAL REVENUE	\$15,280,255	\$16,443,750	\$19,347,750	\$21,214,087	\$22,992,669	\$24,875,124
OPERATING COSTS/KM						
TROLLEYS	\$2.45	\$2.72	\$2.72	\$2.86	\$3.00	\$3.15
DIESELS	\$1.75	\$1.95	\$1.95	\$2.04	\$2.15	\$2.25
EXPRESS(STD)	\$1.40	\$1.56	\$1.56	\$1.63	\$1.72	\$1.80
EXPRESS(ARTIC)	\$1.82	\$2.02	\$2.02	\$2.13	\$2.23	\$2.34
OPERATING COSTS	\$28,251,751	\$30,845,109	\$30,845,109	\$31,936,189	\$33,944,941	\$36,282,708
GENERAL/ADMIN.	\$4,770,350	\$4,760,000	\$4,760,000	\$4,998,000	\$5,247,900	\$5,510,295
TOTAL COSTS	\$33,022,101	\$35,605,109	\$35,605,109	\$36,934,189	\$39,192,841	\$41,793,003
REV./COST RATIO	46.3%	46.2%	54.3%	57.4%	58.7%	59.5%
TOTAL DEFICIT	\$17,741,846	\$19,161,359	\$16,257,359	\$15,720,102	\$16,200,173	\$16,917,879
PROV. SUBSIDY	\$6,501,226	\$7,009,756	\$7,009,756	\$7,161,767	\$7,479,417	\$7,886,357
NET DEFICIT	\$11,240,620	\$12,151,603	\$9,247,603	\$8,558,335	\$8,720,756	\$9,031,521
NET DEF./CAPITA	\$29.66	\$32.06	\$24.40	\$22.40	\$22.65	\$23.29

EXHIBIT 7.4

EXPECTED TAX BURDEN ON AREA MUNICIPALITIES

	HSR BUDGET					
	1983	1984	1984	1985	1986	1987
UTA POPULATION	379,000	379,000	379,000	382,000	385,000	388,000
REVENUE PASSENGERS	25,471,512	25,451,000	29,092,000	29,404,000	29,984,000	30,647,000
PASSENGERS PER CAPITA	67	67	77	77	78	79
HAMILTON						
POPULATION SERVED	310,500	311,000	311,000	312,000	312,000	312,000
MUNICIPAL RIDERSHIP	24,729,007	24,679,995	28,320,995	28,565,495	29,120,995	29,759,495
RIDES PER CAPITA	80	79	91	92	93	95
% UTA RIDERSHIP	97.1%	97.0%	97.3%	97.1%	97.1%	97.1%
ALLOCATED NET DEFICIT	\$10,683,373	\$11,500,135	\$9,002,520	\$8,314,280	\$8,469,754	\$8,769,978
TAX BURDEN PER CAPITA	\$34	\$37	\$29	\$27	\$27	\$28
ANCASTER						
POPULATION SERVED	15,000	15,500	16,000	16,500	17,000	17,500
MUNICIPAL RIDERSHIP	75,000	77,500	80,000	82,500	85,000	87,500
RIDES PER CAPITA	5	5	5	5	5	5
% UTA RIDERSHIP	.0%	.0%	.0%	.0%	.0%	.0%
ALLOCATED NET DEFICIT	\$33,100	\$35,283	\$25,430	\$24,012	\$24,722	\$25,786
TAX BURDEN PER CAPITA	\$2	\$2	\$2	\$1	\$1	\$1
DUNDAS						
POPULATION SERVED	19,500	19,500	19,500	19,500	19,500	19,500
MUNICIPAL RIDERSHIP	409,500	429,000	429,000	448,500	468,000	487,500
RIDES PER CAPITA	21	22	22	23	24	25
% UTA RIDERSHIP	1.6%	1.7%	1.5%	1.5%	1.6%	1.6%
ALLOCATED NET DEFICIT	\$157,878	\$197,891	\$136,368	\$130,541	\$136,116	\$143,664
TAX BURDEN PER CAPITA	\$8	\$10	\$7	\$7	\$7	\$7
STONEY CREEK						
POPULATION SERVED	37,000	38,000	38,000	39,000	39,500	40,000
MUNICIPAL RIDERSHIP	333,000	342,000	342,000	390,000	395,000	400,000
RIDES PER CAPITA	9	9	9	10	10	10
% UTA RIDERSHIP	1.3%	1.3%	1.2%	1.3%	1.3%	1.3%
ALLOCATED NET DEFICIT	\$366,269	\$418,294	\$108,713	\$113,513	\$114,885	\$117,878
TAX BURDEN PER CAPITA	\$10	\$11	\$3	\$3	\$3	\$3

NOTE: IN 1983, allocated net deficit is the actual net cost (cost less revenues) charged by the HSR less provincial subsidies received. In 1984-87, the allocated net deficit is the total net deficit of the HSR proportioned to each municipality on the basis of ridership.

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